AMERICA'S LARGEST TEXTILE MONTHLY

COTTON

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OCTOBER, 1924

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Dalton and Atlanta, Ga.

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OCT 20

Tubize is delightfully soft to the touch, and it has a deep, velvety finish which greatly enhances the appearance of garments made from it.

Tubize is marvelously strong as evidenced by its superior winding, warping and weaving qualities.

Tubize is fundamentally right having a special appeal for the cotton industry. Why?

Tubize is truly "artificial silk at its highest point of perfection."

For further information write

TUBIZE ARTIFICIAL SILK CO. OF AMERICA
Sales Office: 303 Fifth Ave., N. Y. C.
Hopewell, Va Philadelphia, Pa.

Tubize

(Pronounced "two-bees")

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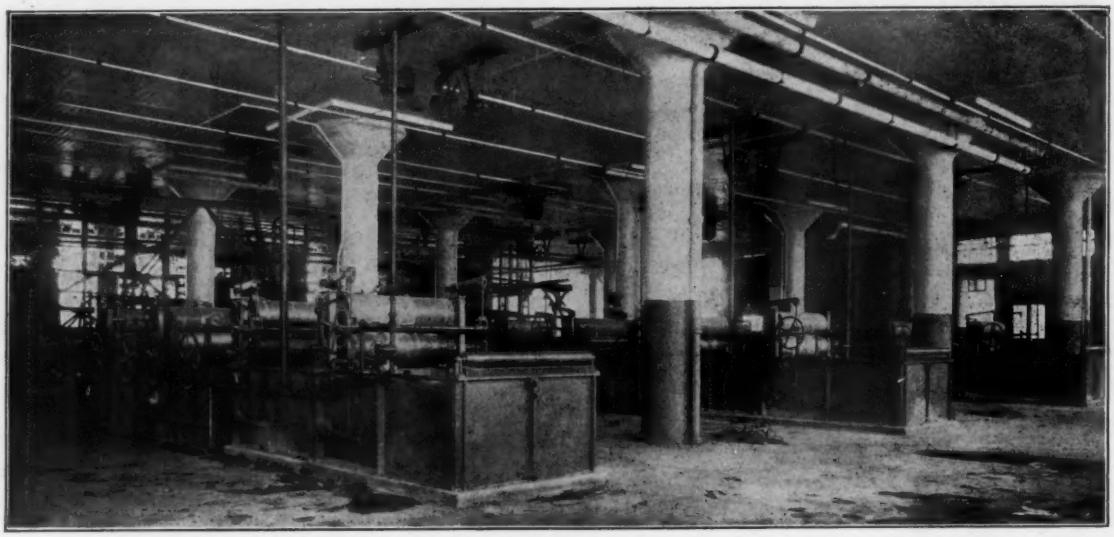


DEPENDABLE

RECENTLY the Riverside and Dan River Cotton Mills were in the market for machinery that they could depend upon to give them quality and production. Naturally as builders of the finest line of machinery for singeing, bleaching, mercerizing, dyeing, drying, printing and finishing textile fabrics and warps, they placed the order with us. The illustration shows a part of this equipment, (three Indigo Dyeing Ranges) installed and doing the same good work as any machine bearing our name has always done.

May we have your inquiries?

MAIN OFFICE AND WORKS
PROVIDENCE, R. I.

NEW YORK OFFICE
30 CHURCH ST.

THE
TEXTILE-FINISHING
MACHINERY
CO

CANADIAN REPRESENTATIVE
WHITEHEAD ENMANS, Ltd.
MONTREAL

SOUTHERN REPRESENTATIVE
H. G. MAYER
CHARLOTTE, N. C

VISIT US
AT THE
TEXTILE EXPOSITION
IN
GREENVILLE, S. C.

SPACES
83, 84, 85, 86,
98, 99, 100
108, 109, 110
(ANNEX BUILDING)

Buying Automatic Looms

You and your mill organization must live with the looms you select.

Your peace of mind, harmony in the industrial household, your success as a manufacturer, and financial ease and comfort may be won or lost by your decision.

The price is important—but not all-important. You must earn dividends on it or go out of business. What is the record as a dividend-producer of the loom you are buying?

Will it start up economically or will the excessive cost of starting wipe out all difference in first cost and add to the capital investment on which you must provide dividends?

Is the loom you select an economical machine to run? What is its production record? How many looms of that make are being run by a single weaver for other manufacturers on the line of goods you are making?

Will it put you on an equality in equipment with your competitor? Your machines must not be less satisfactory than his.

Is it adapted to your particular weaves or are you letting yourself in for months and years of experiment and expensive changes before you get satisfactory results?

Has the loom you would buy the latest in the way of mechanical appliances of proved worth in the practical production of cloth?

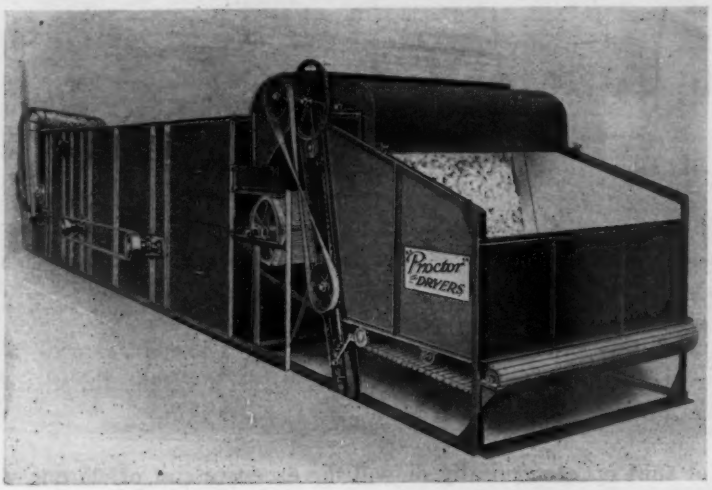
Think These Things Over Before You Buy.

DRAPER CORPORATION

HOPEDALE MASSACHUSETTS

Southern Office Atlanta Georgia

Copyright 1917 by Draper Corporation



Proctor Automatic Dryer for Bleached and Dyed Cotton

Drying Machines for Every Step of Textile Manufacture

Truck Yarn Dryer

THERE'S hardly a drying operation in all textile manufacture with which Proctor Dryer engineers are not fully acquainted. There's scarcely a textile product for which they cannot specify the best means of drying.

This intimate knowledge of approved drying practice is the result of forty-one years' drying experience, during which Proctor Dryers have been evolved in a variety of types which covers every step of textile manufacture.

There are automatic conveyor types of Proctor Dryers for raw cotton, wool and other loose materials; there are automatic and truck types for skein yarn; tray types for package yarns; automatic dryers for warps.

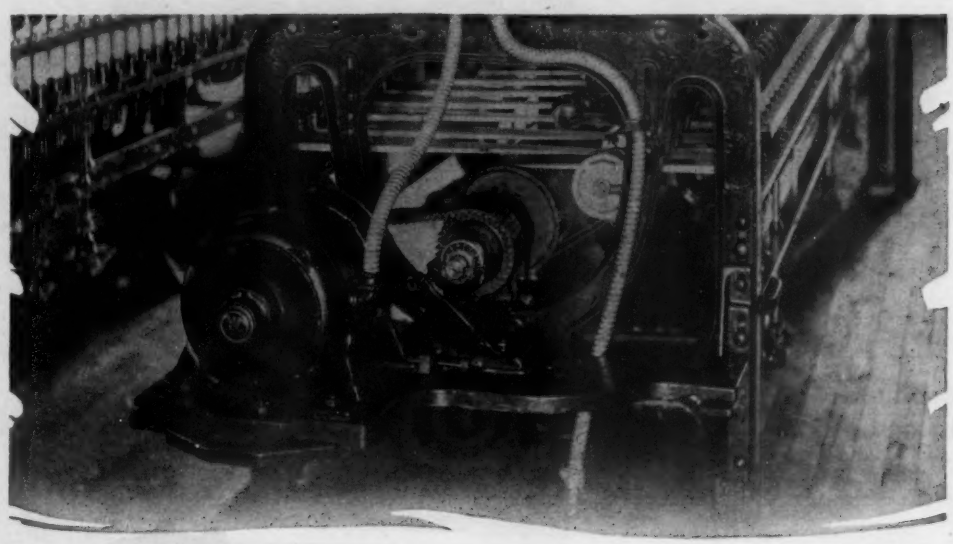
In the finishing stages—for drying piece goods of all kinds, hosiery, carpet; for carbonizing woolen cloth—there are Proctor Dryers, each the best for its specific purpose. And a Proctor housing to increase the efficiency of your tentering machine.

Is there some drying rut in the otherwise smooth road of your production? If so, why not draw on the experience of this organization to help you smooth the road all the way?

PROCTOR & SCHWARTZ, INC.

PHILADELPHIA

SKF



No Destructive Vibration when

Spinning Frames are Ball Bearing Equipped

EIGHTEEN spinning frames in the mill where this photograph was taken are equipped with Skayef Self-Aligning Ball Bearings. Troubles arising from wear of plain bearings resulting in destructive vibration, breakdowns and decreased quality of finished work are thus obviated.

With Skayef Self-Aligning Ball Bearings wear is a negligible factor. They are free and easy running even under conditions of misalignment which would cause plain bearings to heat and bind. The lubricant chambers retain oil for long periods and are effectively sealed against intrusion of foreign matter.

THE SKAYEF BALL BEARING COMPANY

Supervised by SKF INDUSTRIES, INC., 165 Broadway, New York City

1260

Normal View *Deflected View*

The Coming Southern Textile Exposition to be held at Greenville, S. C., will give the cotton trade an opportunity to see Fafnir Products at first hand.

Cotton men have heard of the merits of the **Fafnir Double Ball Bearing Hanger Box.** Here they are:

1. It fits your present hanger.
2. It is easy to install.

3. It reduces power cost.
4. It needs no attention.

5. It runs clean.

We **know** these things are so; we want you to know.

Come to Booth 209-10-11 at this show and see for yourself. The three cotton machinery appliances shown here will also be there together with others of our large textile line. Experts will be ready to discuss your special problems. The Fafnir Exhibit will be worth seeing.

FAFNIR

BALL BEARINGS

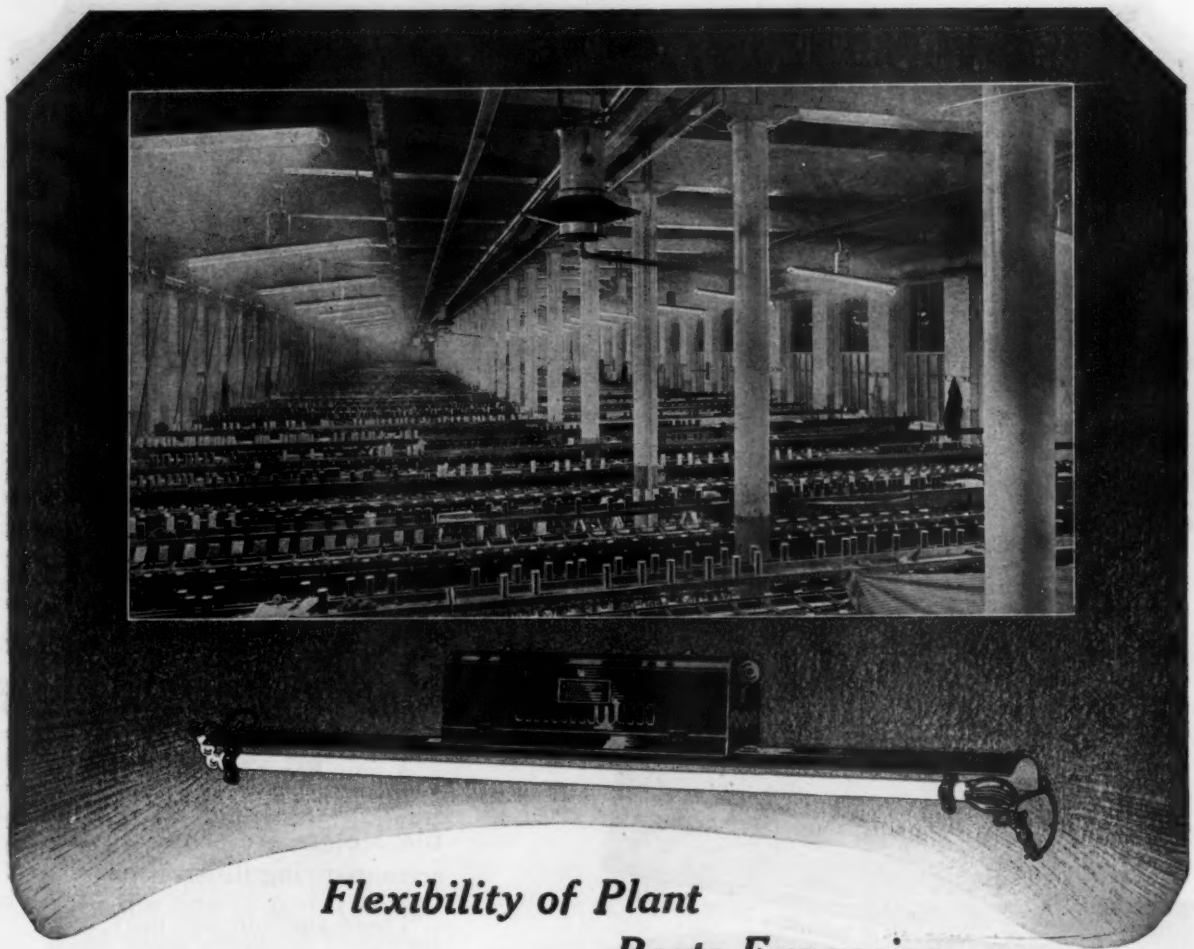
Main Office and Factory
New Britain, Conn.

Southern Representatives

O. R. S. POOL
220 Vail Ave., Charlotte, N. C.

A. G. LAUGHRIDGE
P. O. Box 1847, Atlanta, Ga.

W. S. SHIRLEY,
120 Bourbon St., New Orleans, La.



Flexibility of Plant Beats Expansion

This picture shows Work-Light installation in the winding room of Stehli Silks Corp., Lancaster, Pa., one of the largest companies in the world. A user of Work-Light for twenty years.

DO you really know what your plant can do? What its limit is? Just what it could deliver for you, under all the pressure you could possibly apply?

Do you know it, in facts and figures, or do you meet the question by saying:

"The old factory can do all that we'll ever have for it to do. We built it with that idea in mind." That's reassuring, but it comes far from telling all of the facts.

The capacity of your plant is three times the production of a fully manned eight-hour *day* shift. Multiply daytime production by three — and not by any fraction between two and three — because industrial progress has brought us to the stage at which we no longer need make allowances for slowed-up production at night.

That is one achievement of Cooper Hewitt Work-Light. It has made it possible for three days to grow where only one grew before. A Pennsylvania plant* offers a case in point. New buildings planned several years ago have never been built, because the directors found out in time that it was possible to gain the desired production from existing plant and machines, if only they used the right light. The light installed was Work-Light.

The time may come when triple capacity may save any one of a number of critical situations for you. Work-Light economies on even one-shift operation are so great they should not be ignored.

Work-Light, the glareless, shadowless industrial light, is fully explained in the Work-Light book. Send for your copy today. Cooper Hewitt Electric Company, 89 River Street, Hoboken, N. J.

* *Name upon request.*

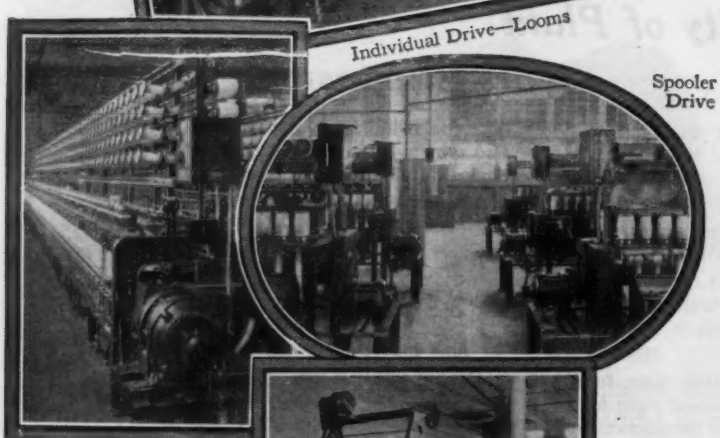
COOPER HEWITT

Work-Light

43 © C. H. E. Co., 1924

Individual Motor Drive for Spinning Frames

Individual Drive—Looms



Spooler Drive

Individual Drive-Twister Frames

Individual Drive-Pickers

Motor Drive in

A number of typical applications of Allis-Chalmers Textile Motors are shown in the accompanying illustrations.

These include not only motors for individual drive, such as spinning frames, looms, twisters, spoolers, pickers, etc. but various types of group drive applicable to old as well as new mills.

Allis-Chalmers Textile Motors are especially designed with characteristics suited to the driven machines.

For more than a third of a century this Company has been engaged in the design, building and commercial application of

See our exhibit at Sections 216,

ALLIS-CHALMERS MANU

MILWAUKEE, WI

Weave Shed—1056 Allis-Chalmers Loom Motors Installed

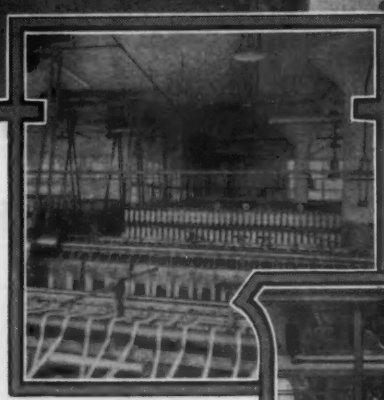
Textile Mills

electric motors and power equipment and was the pioneer in applying motors to individual drive.

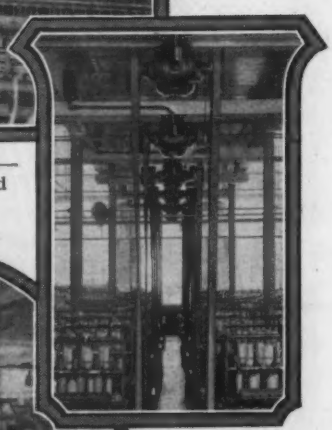
In the line of power equipment Allis-Chalmers builds all types of prime movers with complete electrical equipment, also many auxiliaries, centrifugal pumps, air compressors, transmission machinery, etc.

The Southern Textile District is very largely served by power from Allis-Chalmers equipment, particularly hydro-electric equipment, in many of the large water power developments in this region.

Allis-Chalmers engineers are pleased to serve you.

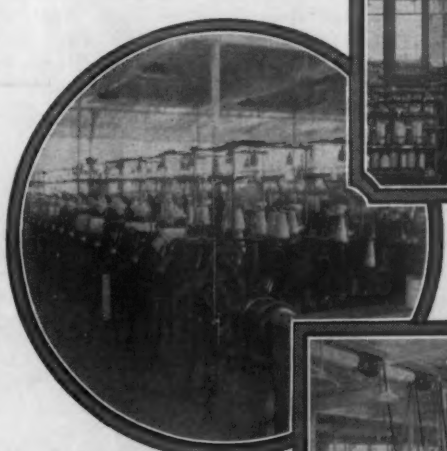


Spinning Frame Drive—Motors with extended shafts.

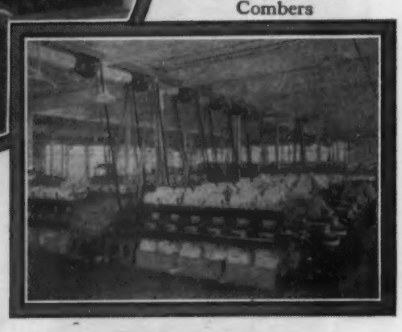


Four Frame Drive—Spinning Frames.

Four Frame Drives—Combers



Motor Drive—Hosiery Knitting Machines



Greenville Exposition
217 and 218.

FACTURING COMPANY
SCONSIN. U.S.A.

ELIMINATE this BIG WASTE!

How much of this willful waste is going on in *your* plant?

A tiny hole unheeded will drain the largest reservoir. So the profits of a business can dribble away through even small leaks.

You'd probably be astounded if you knew what a large sum it costs you every year for *renewable* fuses that employees throw away after they have been blown *only once.*

That is the natural fate of fuses that are hard to take apart due to complicated design and because heat and gases from a blowout fuse the metal parts.

The vanishing link and specially treated washers in "Union" Renewable Fuses make the fusing of metal parts impossible. There's nothing to stick. And having but a few, simple parts, "Union" Fuses can be taken apart and a new link inserted easily, quickly, without fuss. Consequently there is no excuse for not renewing a "Union."

Heavy, rugged design enables "Union" to withstand a greater number of blowouts than any other renewable fuse.

Approved in the highest degree by the National Board of Fire Underwriters, no fuse can be more safe nor dependable than a "Union." Electrical jobbers and dealers everywhere sell both types—Renewable and Non-Renewable.

The "Union" saves more than ANY other renewable fuse

Chicago Fuse Mfg. Co.

Manufacturers also of Switch and Outlet Boxes, Cut-out Bases, Fuse Plugs, Fuse Wire and Automobile Fuses

Chicago **New York**

'UNION' RENEWABLE & NON-RENEWABLE FUSES

SOLID FACTS ABOUT SERVICE

"Service"—the word—is a term hackneyed by over-use. Service—the fact—is too important to be overlooked.

WESTINGHOUSE serves users of Westinghouse motors not only through the quality built into the product, but also through—

Expert Engineering Counsel, when desired, based both on thorough electrical knowledge and on practical experience with the varied requirements of industry.

Twenty-six Service Shops—so located as to be within a night's journey from any industrial center, and equipped for either normal or emergency requirements.

Twenty-Nine Warehouses—carrying reserve stocks of motors of all popular ratings, as well as renewal parts which are immediately available.

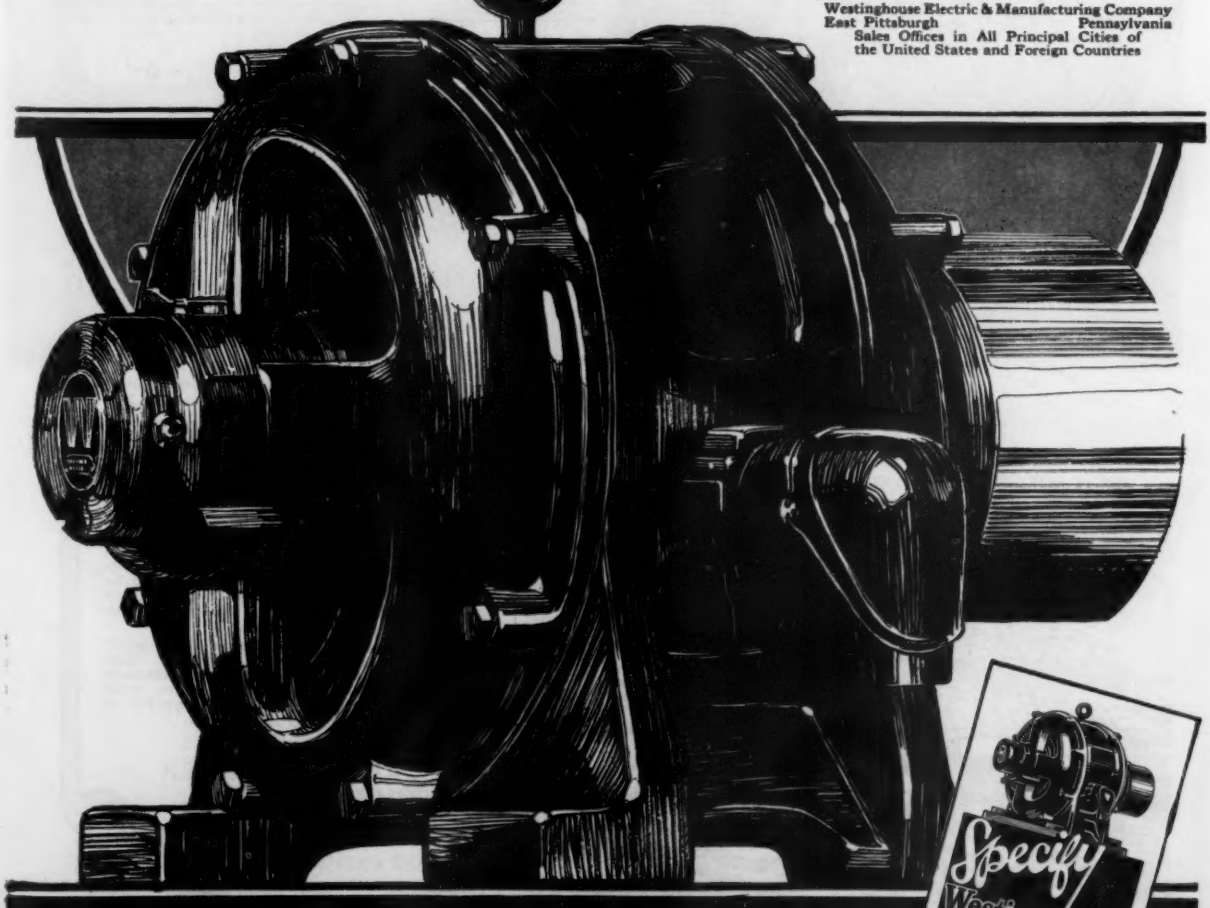
Ninety-One Offices—within reasonable telephone distance from any town in the United States.

Jobbers and Dealers Everywhere—authorized to sell Westinghouse products because they are *organized to serve* Westinghouse users.

An Ultra Modern Factory—at Homewood, Pa.—dedicated solely to giving emergency service on renewal parts.

The completeness and accessibility of Westinghouse Service has no parallel. Ask any experienced user.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of the United States and Foreign Countries



Westinghouse

Tennessee—The Heart of Industrial America

—and it's just Beginning!

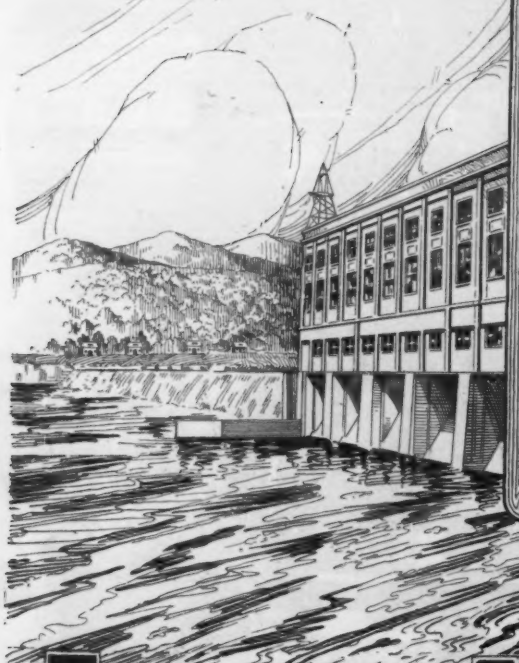
Roger W. Babson says: "It is only four o'clock in the morning for the new South. Although this new section is prospering now, its real day of opportunity is only beginning to dawn."

This statement of the wonderful opportunities of the South is particularly true of Tennessee. A trip through this state will open your eyes to the real prosperity enjoyed by textile mills operating in this section. Over 150 plants, representing practically every branch of the industry, are successfully operating here today and numerous other plants are starting up. The illustrations show 3 of the many prosperous mills in Tennessee. No. 1—Standard Coosa Thatcher Co., Spinning and Mercerizing Plants, Capital $5,000,000. 56,000 spindles. No. 2—United Hosiery Mills, Capital and Surplus $4,000,000. 1200 Knitting Machines. No. 3—Dixie Mercerizing Co., Capital $1,000,000.

New England mill men have come to recognize more and more that Tennessee is the logical location for the expansion of their plant facilities and are erecting mills in various communities in this state. The American Printing Company of Fall River is building a 100,000 spindle mill at Kingsport; a large mill is to be located at Johnson City by the Gloria Textile Corporation of Massachusetts; Maryville, Newport and other Tennessee towns are being studied as locations for worsted plants.

Tennessee's ample supply of pure American labor—ideal workmen—has been largely responsible for this development. This factor together with nearness to the large cotton centers, adequate transportation facilities and abundant hydro-electric power, make Tennessee a most desirable section for the continued growth of the textile industry. Write us for complete information.

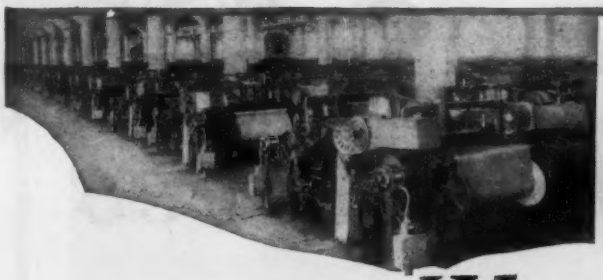
THE
TENNESSEE ELECTRIC POWER
COMPANY
CHATTANOOGA, TENNESSEE

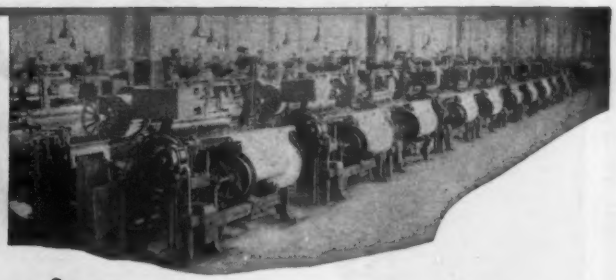


The Tennessee Electric Power Co.

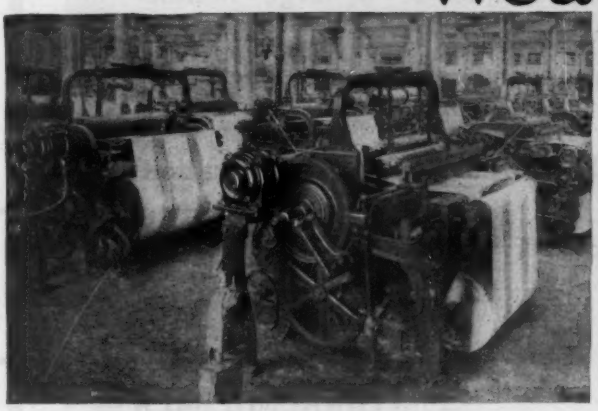
Cotton

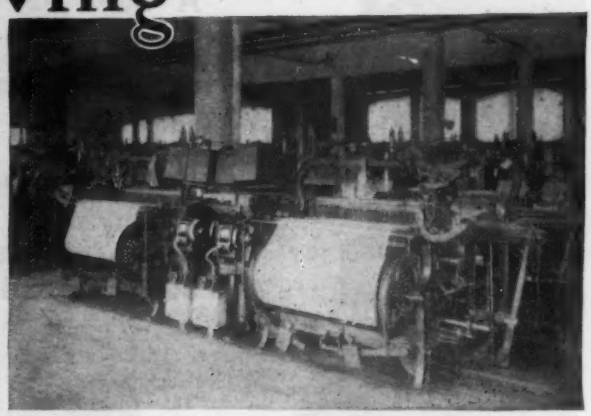
To Maintain Maximum Production Speed





Weaving





Use G-E Individual Motor Drive

There are many mills using G-E Loom Motors in numbers of 1000 and upward—and their method of drive is a motor geared to each loom.

This accepted form of individual drive secures a uniform speed which obtains greatest production from the loom, and the best quality of product.

For this service, G-E Motors are totally enclosed; and have waste-packed, dust-tight bearings; tapered shafts, oil-tempered steel pinions. They are designed for low slip, low temperature rise, and high operating characteristics. A complete line of G-E Motors up to 2 HP, for various voltages and frequencies, are available—with G-E Controllers to suit.

General Electric Company
Schenectady, N. Y.
Sales Offices in all Large Cities

GENERAL ELECTRIC

44-50

LUNKENHEIMER

Pop Safety and Relief Valves

A most extensive line of a large number of designs made in various combinations of materials, permitting of a broad choice for any service, pressure or temperature.

Reliable, durable and economical in operation and maintenance.

Write for booklets 502 and 584-AK.

VISIT OUR BOOTHS 214 AND 215
Sixth Southern Textile Exposition
Exposition Building Annex
Greenville, S. C. Oct. 20 to 25, 1924

THE LUNKENHEIMER CO.
"QUALITY"
LARGEST MANUFACTURERS OF HIGH GRADE ENGINEERING SPECIALTIES IN THE WORLD
NEW YORK CHICAGO CINCINNATI, U.S.A. BOSTON LONDON
EXPORT DEPT. 129-135 LAFAYETTE ST., NEW YORK

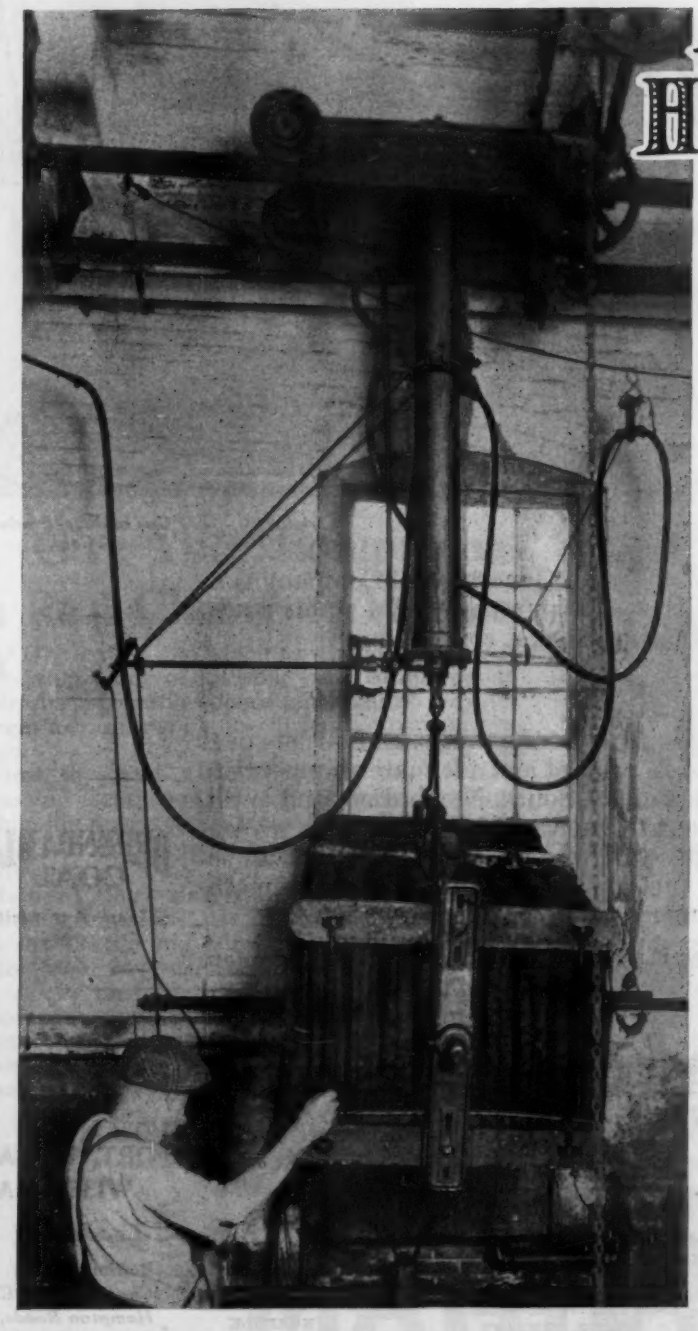
Fig. 146 Iron Body Bronze Mounted Outside Spring Pop Safety Valve	Fig. 630 Iron Body Bronze Mounted Encased Spring Pop Safety Valve	Fig. 433 Bronze Encased Spring Top Outlet Pop Safety Valve	Fig. 656 Bronze Encased Spring Top Outlet Cylinder Relief Valve

"America's Best since 1862"

4-24-10

CURTIS

AIR HOISTS



Used in The Textile Industry

Curtis one man All Steel Air Hoists and Curtis Roller Bearing Trolleys are effecting important economies in leading textile mills throughout the country.

Why not install a Curtis Air Hoist and operate it with the air you now have available? The wide variety of uses to which Curtis equipment can be most economically applied is worthy of your immediate investigation.

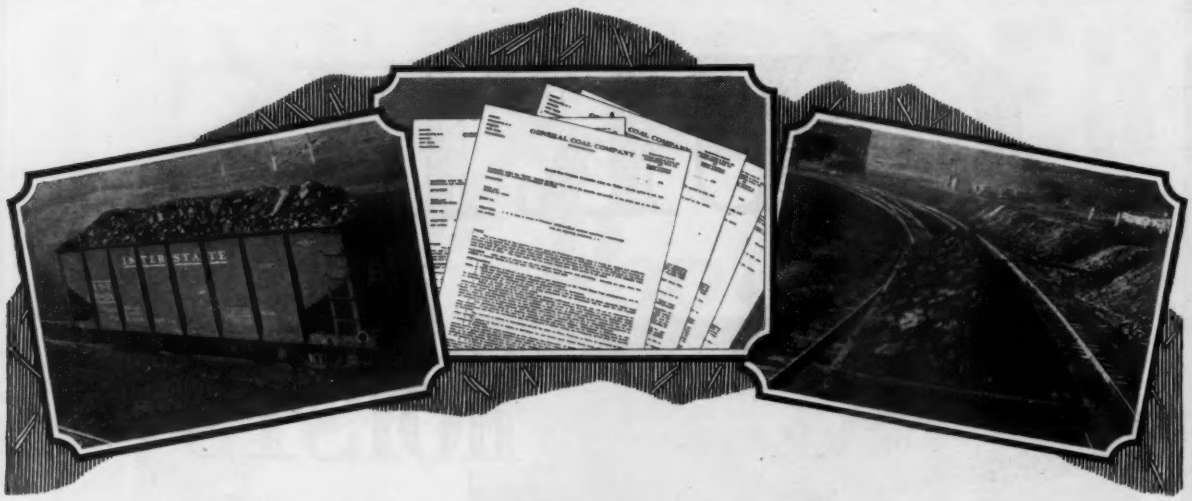
Curtis Pneumatic Machinery Company

1571 Kienlin Ave., St. Louis, Mo.

Branch Office

532-R Hudson Terminal, New York

CURTIS
AIR COMPRESSORS-HOISTS-TROLLEYS-CRANES
ST. LOUIS
Established 1854



The Coal, The Contract, and the Service

The Coal—

"General" Coals are so carefully prepared before shipment that they should be considered "manufactured" products. Constant inspections and frequent tests assure cleanliness and uniformity in every ton—more to burn, less to pay.

STONEGA
Steam and By-Product Coal

RODA
Gas and By-Product Coal

The Contract—

The purchaser of coal on a General Coal Company contract realizes quality coal is purchased at a stable price, unaffected by fluctuating market conditions.

The Service—

Transportation facilities at the mines, and outlets over five trunk lines assure prompt and adequate shipments to all industrial centers of the South, North, East and West. Furthermore, General Coal Company maintains a combustion engineering staff who are most interested in securing the proper fuel and most economical firing methods for each customer's particular requirements.

Admiralty Coal
New River Smokeless

DEPENDABLE COAL
Finest Anthracite

The nearest office is ready to discuss your fuel problem *intelligently.*

GENERAL COAL COMPANY

1727 Land Title Building
PHILADELPHIA

EXCLUSIVE SALES AGENT
—FOR—
STONEGA COKE AND COAL COMPANY
HAZLE BROOK COAL COMPANY
—AND—
SUCCESSOR TO BUSINESS OF
WENTZ COMPANY

BUNKER COAL
Supplied at
Baltimore, Md.
Charleston, S. C.
Hampton Roads, Va.
New York, N. Y.
Philadelphia, Pa.
Savannah, Ga.

BOSTON
CHARLESTON
CHARLOTTE
CINCINNATI
DETROIT
FAIRMONT
NEW YORK
NORFOLK
PHILADELPHIA

EXPORT & COASTWISE COAL
Loaded at
Baltimore, Md.
Charleston, S. C.
Hampton Roads, Va.
Philadelphia, Pa.

Give Your Equipment a Real Chance to Produce!

YOU textile manufacturers who realize the importance of keeping your equipment in steady, profitable operation, realize too the twin advantages of an efficient conveying system:—

First, to assure a steady supply of materials passing through production to warehouse and shipping department; second, to relieve congestion and release floor space for essential floor work.

Mathews Conveying Systems, in various types and combinations, have rendered leading firms in the Textile and allied industries a real service for many years. The installations shown here, in the plants of the American Thread Company and the Burson Knitting Company, respectively, show how other Mathews installations by the score in this Industry have kept materials moving to machines and away again; have released floor space; and have reduced manual-labor costs almost to the vanishing point.

Near you is a Mathews Engineer capable of going over your processes with you, making a preliminary survey, and indicating what a Mathews System would do for you, if he finds that one could be installed at a saving. We shall be glad to arrange for him to call—without obligation, if you are seriously interested in getting the real facts.

MATHEWS CONVEYER COMPANY, 162 Tenth St., Ellwood City, Pa.

Formerly Mathews Gravity Carrier Co. Canadian Factory: Port Hope, Ont.

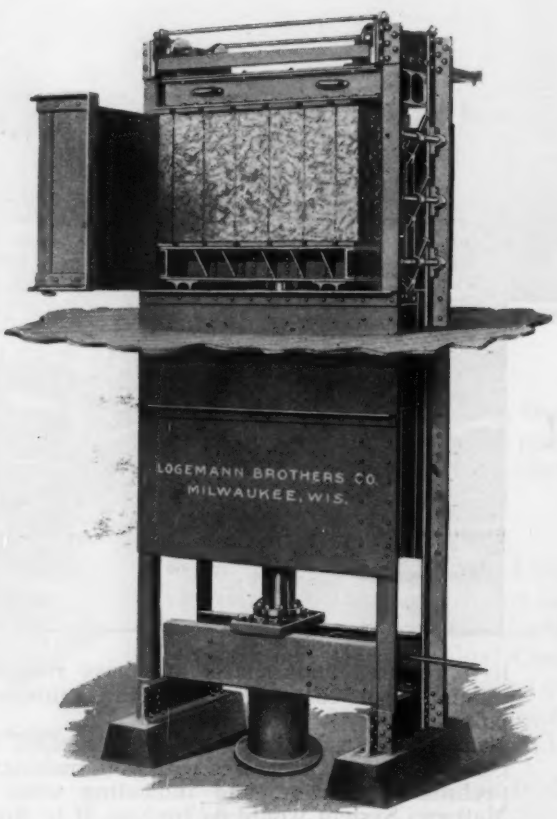
MATHEWS

Conveyer Systems

LOGEMANN

Hand-Belt-Electric-Hydraulic

Baling —— Presses



There Are
LOGEMANN BALERS
For All Purposes

In our line of more than eighty types and capacities will be found a machine to suit every conceivable purpose and condition from powerful hand-operated presses for baling clippings to deep-box hydraulic machines for fluffy waste of all kinds.

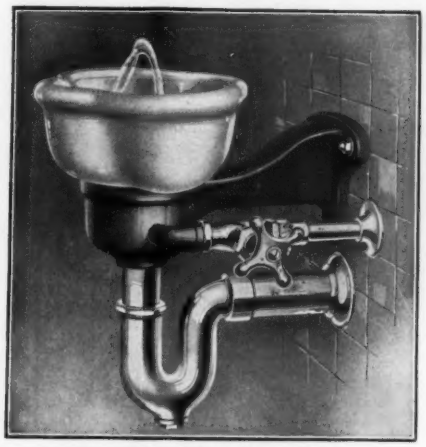
Progressive mill operators are today adopting the LOGEMANN press as standard (*First*) Because of the quality of the workmanship, design and material; (*Second*) because of the stability of the company building these machines, and our reputation for speedy service on the comparatively rare occasions when repairs are needed.

A letter setting forth your baling problems will be appreciated.

LOGEMANN BROTHERS CO.

3102 Burleigh St., Milwaukee, Wis.

HALSEY TAYLOR
DRINKING FOUNTAINS



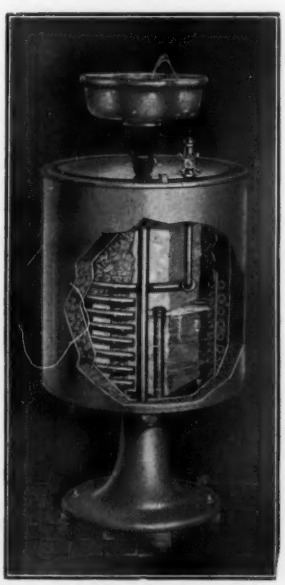
No. 600 Wall Fountain

A popular type, used in textile and other industrial plants throughout the country. Has exclusive Halsey Taylor Automatic Stream Control "Cantonment" Two-Stream Projector and is modestly priced.

See our Exhibit at the TEXTILE SHOW

Greenville, S. C.
Oct. 20 to 25, 1924

The last word in sanitation is expressed in this exhibit of Halsey Taylor Drinking Fountains. No other fountain gives you the positive assurance of a uniform height of water at any pressure, none can give you their practical advantages, none can so please your workmen nor promote their welfare as Halsey Taylor Drinking Fountains. Automatic Stream Control, "Cantonment" Two-Stream Projector (developed during the war for Uncle Sam and today approved as the most efficient and sanitary projector yet designed)—these are only a few reasons why it will pay you to see our exhibit.

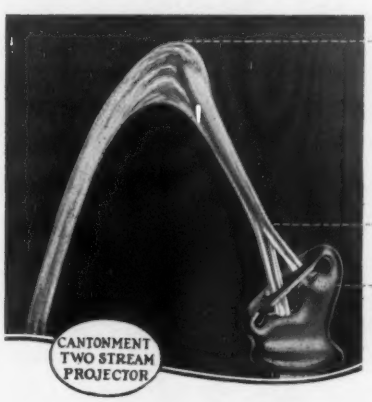


No. 800 Cooler Fountain

The standard cooler fountain of America, combining the very best in cooler construction with the very latest in sanitary drinking devices. The cooler is so constructed that water does not come in contact with the ice, the walls are insulated with re-granulated cork. Ice consumption is kept to a minimum. Exclusive Halsey Taylor Automatic Stream Control and Two-Stream Projector.

Write for Special Catalog

The Halsey W. Taylor Company
Park Ave. & Erie R. R., Warren, Ohio

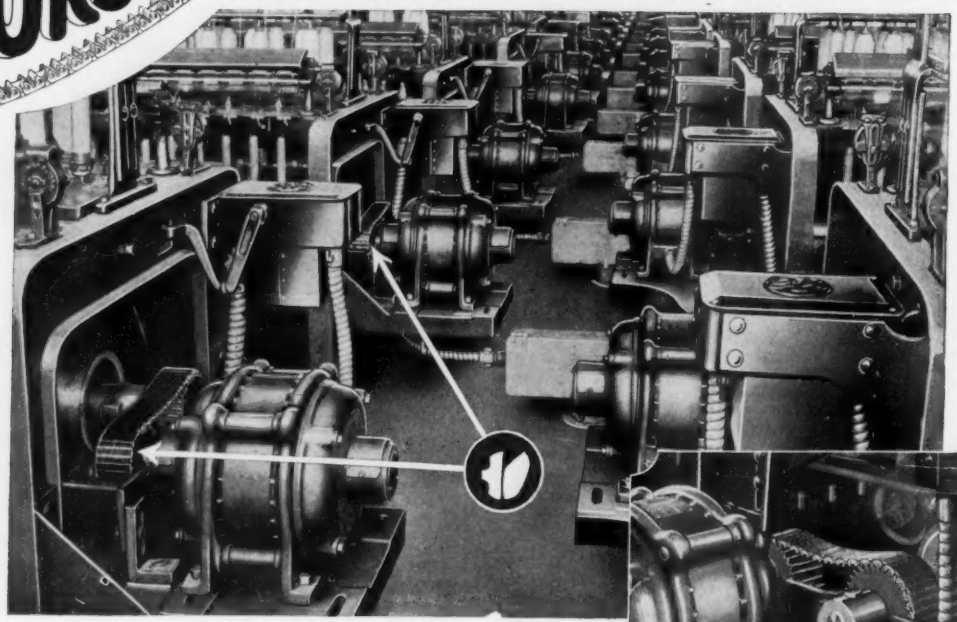


Uniform height of stream regardless of pressure due to automatic stream control.

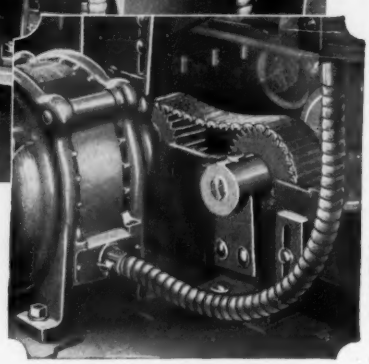
Converging stream forms ideal drinking mound avoiding contamination.

"Cantonment" two-stream projector.

MORSE SILENT CHAIN DRIVES



5 H.P. Morse Silent Chain Drives connecting motors to Whitin Spinning Frames, Efird Mills, Albemarle, S. C.



Close-up of drive to spinning frame.

"One of our most profitable investments"

So says Mr. C. G. Voss, Supt. Efird Mfg. Co., Albemarle, N. C., regarding the 120 Morse Silent Chain Drives of 5 and 7½ h.p. used on spinning frames; the 64 Drives of 5 and 7½ h.p. on their twisters; and the four group Drives of 10 and 20 h.p. installed on the carding machines in this mill.

Here, as in thousands of other mills throughout the country, Morse Silent Chain Drives transmit 98.6% of the horsepower developed by the motor. They eliminate slip and they frequently account for at least 10% more production from each spinning frame and twister. Cleaner yarn is produced, since there is no fly and dirt from pulleys and belts to get into the yarn. Customers are better satisfied and complaints avoided.

The Morse Drives in the Efird Mfg. Co. have given unfailing service for 7 years. In many plants over 15 years' performance has been secured without a breakdown and with only negligible repairs.

You too, perhaps, can use Morse Silent Drives to advantage in your own plant. Let the Morse Engineer give you further information.

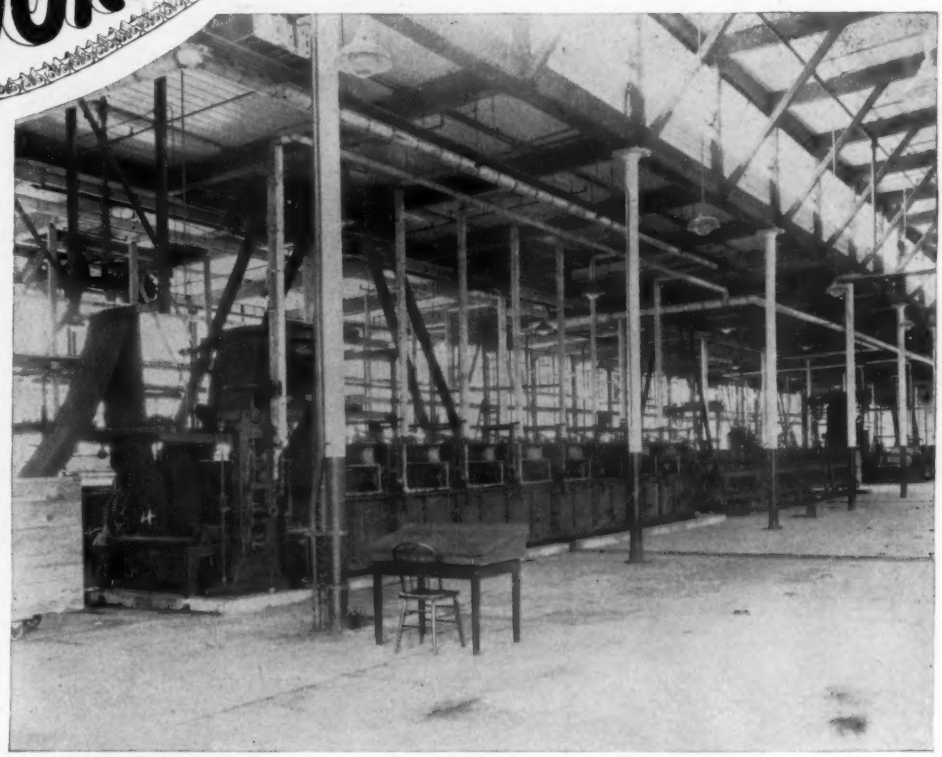
MORSE CHAIN CO., ITHACA, N. Y.

There is a Morse Engineer near you

ATLANTA, GA., 702 Candler Bldg., Earl F. Scott & Co.
BALTIMORE, MD.....1402 Lexington Bldg.
BOSTON, MASS.....141 Milk Street
CHARLOTTE, N. C.....404 Commercial Bank Bldg.
CHICAGO, ILL.....Room 803, 112 West Adams Street
CLEVELAND, OHIO.....421 Engineers Bldg.
DENVER, COLO.....211 Ideal Bldg.
DETROIT, MICH.....7601 Central Avenue
NEW YORK CITY.....Room 1871, 50 Church St.
MINNEAPOLIS, MINN., 413 Third St., S., Strong-Scott Mfg. Co.
PHILADELPHIA, PA.....Room 803, Peoples Bank Bldg.
PITTSBURGH, PA.....Westinghouse Bldg.
SAN FRANCISCO CAL.....Monadnock Bldg.
ST. LOUIS, MO., Railway Exchange Bldg., Morse Chain Co.
TORONTO, ONT., CAN.....Strong-Scott Mfg. Co.
WINNIPEG, MAN., CAN., Dufferin St., Strong-Scott Mfg. Co.

2185-30

MORSE SILENT CHAIN DRIVES



Interior view, The Gregg Dyeing Co., Graniteville, S. C., the largest dyeing and finishing plant in the world devoted exclusively to sulphur khaki work. Three Morse Silent Chain Drives are depended on for turning out the plant capacity of one-half million yards a week.

Transmitting power with 98.6% efficiency

The Morse Silent Chain Drive consists essentially of three parts—a driving sprocket, a driven sprocket, and a silent endless chain. It transmits power from one shaft to another in the same way as a belt or gear drive,—but with the same following advantages:

The Morse Silent Chain Drive continuously transmits, year in and year out, 98.6% of the horsepower developed by the motor. It cannot slip or stretch, and therefore secures increased production with economy of power consumption.

Permits a high ratio of speed reduction in a single drive. May be run on long or short centers as desired, conserving floor space and permitting the most convenient arrangement of machinery.

Does not obstruct light or collect dust. No dangerous static electrical sparking.

May be used in hot, cold or damp places without deterioration. Quiet at all speeds,—no chattering. The load is uniformly distributed over a large number of sprocket teeth, all carrying their proportionate share of the load, resulting in smooth action, little wear, and long life.

Uses less expensive standard high speed motors to operate machines at most desirable speeds. Runs slack without initial tension and therefore with low journal friction.

Is elastic and flexible, and absorbs or cushions the shocks and jars due to starting, stopping and sudden overloads, thereby protecting motor armatures, bearings, and other rotating parts from unnecessary wear and tear.

Long life and low up-keep cost. Requires only little lubrication at infrequent intervals.

The outstanding characteristics of the Morse Silent Chain is the Rocker Joint which substitutes rolling or rocking motion at the joint for sliding friction, reducing wear to a minimum and insuring long life.

For complete information, get in touch with the Morse Engineer in your territory.

MORSE CHAIN CO., ITHACA, N. Y.

There is a Morse Engineer near you

ATLANTA, GA., 702 Candler Bldg., Earl F. Scott & Co.
BALTIMORE, MD.....1402 Lexington Bldg.
BOSTON, MASS.....141 Milk Street
CHARLOTTE, N. C.....404 Commercial Bank Bldg.
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SAN FRANCISCO CAL.....Monadnock Bldg.
ST. LOUIS, MO., Railway Exchange Bldg., Morse Chain Co.
TORONTO, ONT., CAN.....Strong-Scott Mfg. Co.
WINNIPEG, MAN., CAN., Dufferin St., Strong-Scott Mfg. Co.

2185

CONE WINDING

All latest designed Foster Winding Machines will be shown in operation at the Sixth Southern Textile Exposition, Greenville, S. C., Oct. 20-25.

Important to **Cloth Mills** and **Spinners** of **Warp Yarn**
The Foster Filling Wind Spooler Tension shown above is the vital link in the success of the Filling Wind System of Spinning Warp Yarns. It will be demonstrated at our Exhibit.

FOSTER MACHINE COMPANY

WESTFIELD, MASS.

John Hill, Southern Representative, Healey Bldg , Atlanta, Ga.

Have You the 17th Plant?

Only one plant in 17, no matter how efficient it may be in other lines, really has its oil-handling **properly** organized.

And more than that, our engineers say, only one in six fully recognizes that it has an oil-handling problem at all!

These amazing figures are the result of our nearly 40 years of experience in engineering standard tanks and pumps to fit individual requirements in all kinds of businesses everywhere.

Oil is such a seemingly inconspicuous item of expense, that few men yet realize that they can save a big item of labor, that they can decrease machinery shutdowns and depreciation, that they can speed up production—and all by investing a few dollars in Bowser oil handling systems, systems that will fully pay for themselves in one to three years.

As you would expect, our men are trained to help you save and make money on oils—whether for individual machine lubrication, or in your power plant, or for your trucks. They are specialists in **oil conservation,** for we build filters and purification systems, as well as tanks, pumps and distributing outfits.

Because of this experience, we have been called on to devise systems for handling such widely-differing liquids as face creams, shoe blackings, glucose, silicate of soda, olive oil, glue, newspaper inks, varnishes, shellacs, alcohol, turpentines, linseeds—in fact, pretty nearly everything that's valuable and fluid!

Our belief is that we can save you money, too—and make your plant run more smoothly. We have no "cure-all" printed matter that covers all cases, but our engineers will meet frankness with frankness, and consult with you in confidence as how to best improve your operating conditions.

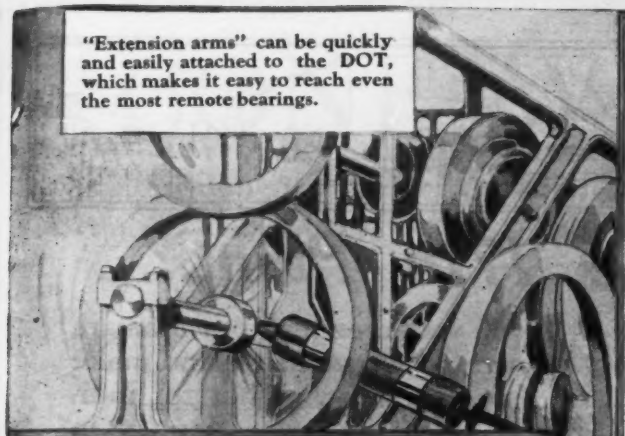
For our mutual convenience, and to speed your letter, please address Desk 45, Plant Engineering Division

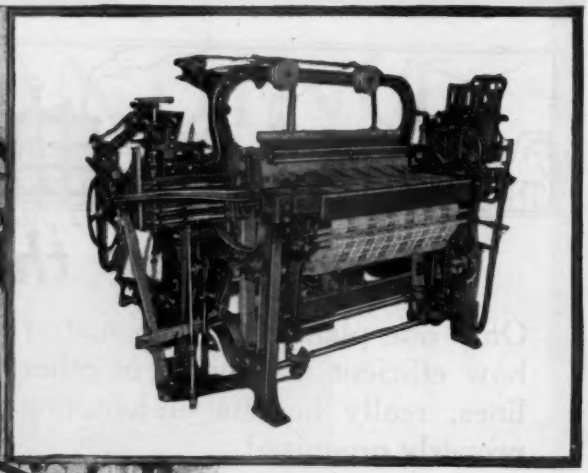
S.F. BOWSER & COMPANY, Inc.

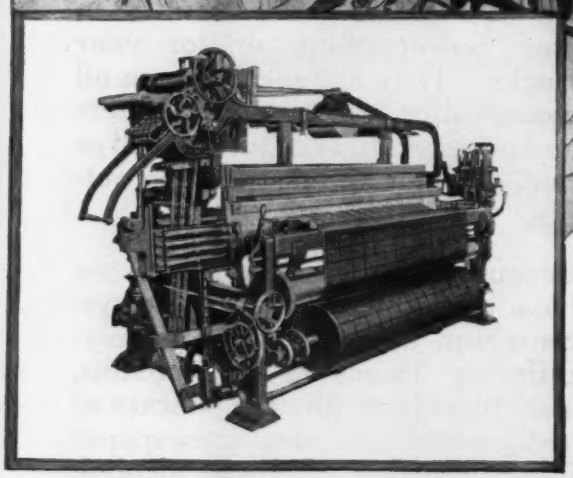
Dependable Pumps and Tanks

FORT WAYNE, INDIANA, U.S.A.

Sales and Service Representatives All Over The World







Textile Men—

Don't miss the DOT Demonstration at the Sixth Southern Textile Exposition

Exposition
Greenville, S. C.
October 20-25

The DOT Lubricator is thoroughly protected by allowed claims of pending patent applications.

DOT TRADE MARK

See the powerful, DOT High Pressure lubricator demonstrated at—

Spaces 239 to 242 inclusive

Let us show you how quickly and thoroughly you can lubricate your looms with the DOT. Perfect lubrication makes your machines last longer. It eliminates costly replacements of rocker shaft boxes, cam shaft boxes and other bearings that ordinarily cause trouble.

And you can reach even the most remote lubricating points with perfect safety and ease, even when the machine is in operation.

The heavy, thread engagement of nipple and nozzle makes a perfect leak-proof connection. No grease nor oil can escape or come in contact with the work in progress.

Let us show you

THE WALRAVEN COMPANY

38 WEST ALABAMA STREET ATLANTA, GA.

high pressure LUBRICATOR

Payroll Loss In the Textile Industry

THE payroll dollar of today buys approximately seventy-five cents worth of productive effort. In some widely known plants, which are considered to be well managed, it may buy even less.

Many textile executives have been blind to the fact that basically, production is controlled by the motives of employees and that an enormous loss per annum is accumulated from the apparently small loss per employee arising from such avenues as tardiness, loitering or stopping, material spoilage from carelessness, reeds, shuttles or draw-frame rolls spoiled or broken, an occasional dead spindle, seconds, warp re-drawn, yarn running half a number too heavy, cuts a fraction too short, folders measuring excess yardage, errors in moisture content, coal wastage—and scores of other items that are due to carelessness, oversight, lack of interest in the job, all basically due to unsound motives in the minds of the employees, which in turn results in payroll losses—losses to the employee as well as the employer.

The true essence of successful industry today is the good-will of the worker—a constructive, energetic good-will which returns one hundred cents of productive cooperation for every payroll dollar.

Such good will can be established only on mutual understanding and respect between employer and employee; and it can be developed only through practical personal education in a language which the employee can grasp and believe. Once taught the real facts of his responsibilities, advantages and opportunities, he will bring to his job a good-will that means prosperity and stability.

The successful remedy is to treat the motives of employees as actual and practical entities, the same as the human body; to accurately and fairly analyze the motives of individual employees; to devise adequate and proper treatment; and to administer this sound treatment so that it will be absorbed beneficially by each individual.

The result will materially benefit not only the employer but the employee and his family as well.

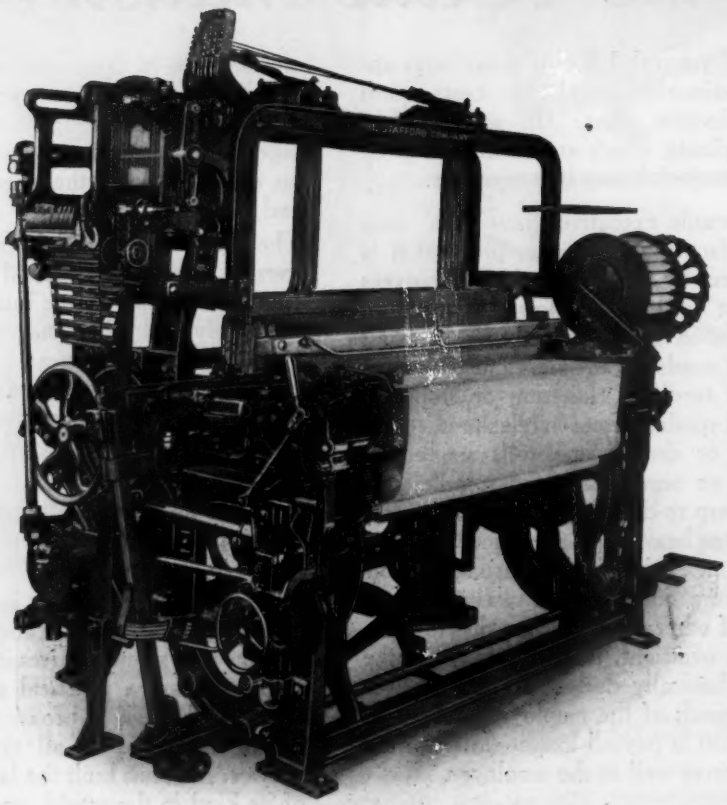
In all principal industries in this country, including textiles, there is ample experience to show that sound motives in the minds of employees are a practical asset of great value. Through a broad experience in serving industries of all types Sherman Service, Inc., has built the largest business of its kind in the world, and is prepared to confer fully with any employer or manufacturer, without obligation for the purpose of analyzing the existing conditions in the plant, and discussing in detail the necessary applications of Sherman engineering needed to bring payroll loss and market loss within satisfactory contol, through the analysis and rebuilding of the employees' motives.

SHERMAN SERVICE, INCORPORATED

Man Engineering — *Production Engineers*

Boston, Mass., 31 Milk Street
Cleveland, Ohio, Park Building
Detroit, Mich., First National Bank Bldg.
New York, N. Y., 2 Rector Street
Philadelphia, Pa., 1015 Chestnut St.
Toronto, Ontario, 10 Adelaide St., E.
Chicago, Ill., 208 So. LaSalle St.
St. Louis, Mo., 314 N. Broadway
Montreal, Quebec, Drummond Bldg.

STAFFORD



Now is the Time

to prepare for the good times that are coming.

Whether it be automatic looms, light or heavy, plain or fancy, dobbies or weaving mechanisms of almost any character, remember that in buying Stafford products you receive not only machinery of the highest character but with it goes Stafford service backed up by many years of experience and a reputation for fair and generous dealings at all times.

Our organization is at your service in helping to solve any of your weave room problems.

The Stafford Company, Readville, Mass.

Weaving Machinery

Branch Office
179 Ellison St.,
Paterson, N. J.

Southern Agent
Fred H. White,
Charlotte, N. C.

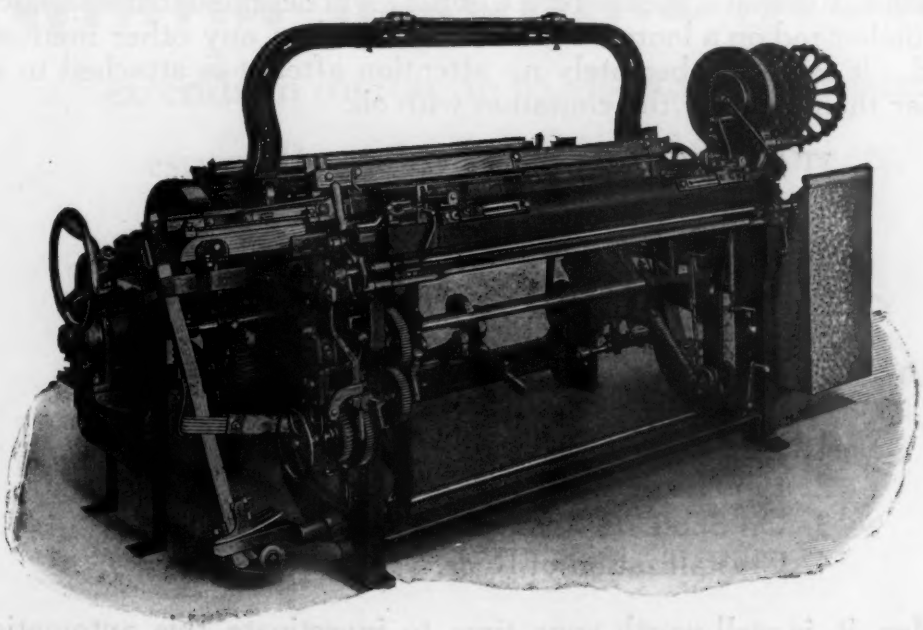
Canadian Representative
Whitehead, Emmans, Limited
Montreal

Stafford Automatic Looms

The illustrations on these two pages show typical Stafford looms.

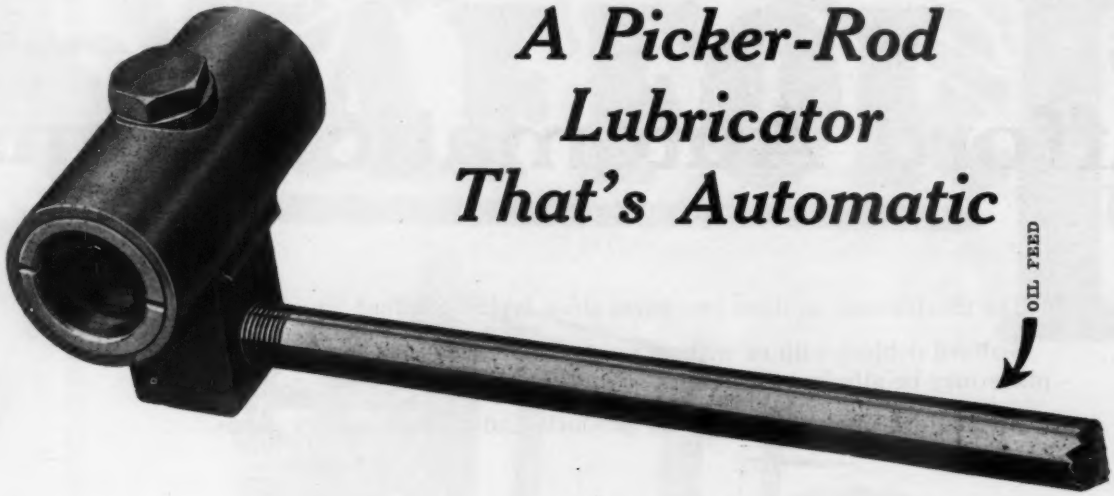
Stafford dobbies with or without jumper motions, slackeners or multipliers may be attached to Stafford or any other make of loom.

All Stafford products are quality products and produce quality goods.



AUTOMATIC LOOMS

A Picker-Rod Lubricator That's Automatic



The Baldwin Automatic Picker Rod Lubricator is designed to automatically oil a picker rod on a loom—and do it better than any other method now used. It requires absolutely no attention after it is attached to a loom other than refilling the container with oil.

IT SAVES—

1. Oil.
2. Time and Labor.
3. Lug Straps and Bunters.
4. Prolongs Life of Picker and Rod.

IT PREVENTS—

1. Breakage of Picker Sticks.
2. Fire Caused by Floor Wastage of Oil.
3. Oil Spots on Fabrics.
4. Crystallization of Rods.

Textile Men, it is well worth your time to investigate this automatic picker-rod lubricator. Write for full information today.

The Baldwin Picker-Rod Lubricator Co., Framingham, Mass.

BALDWIN
Automatic
PICKER-ROD LUBRICATOR

THE

WHITIN MACHINE WORKS

extends an invitation to all those interested,

especially to its friends and customers,

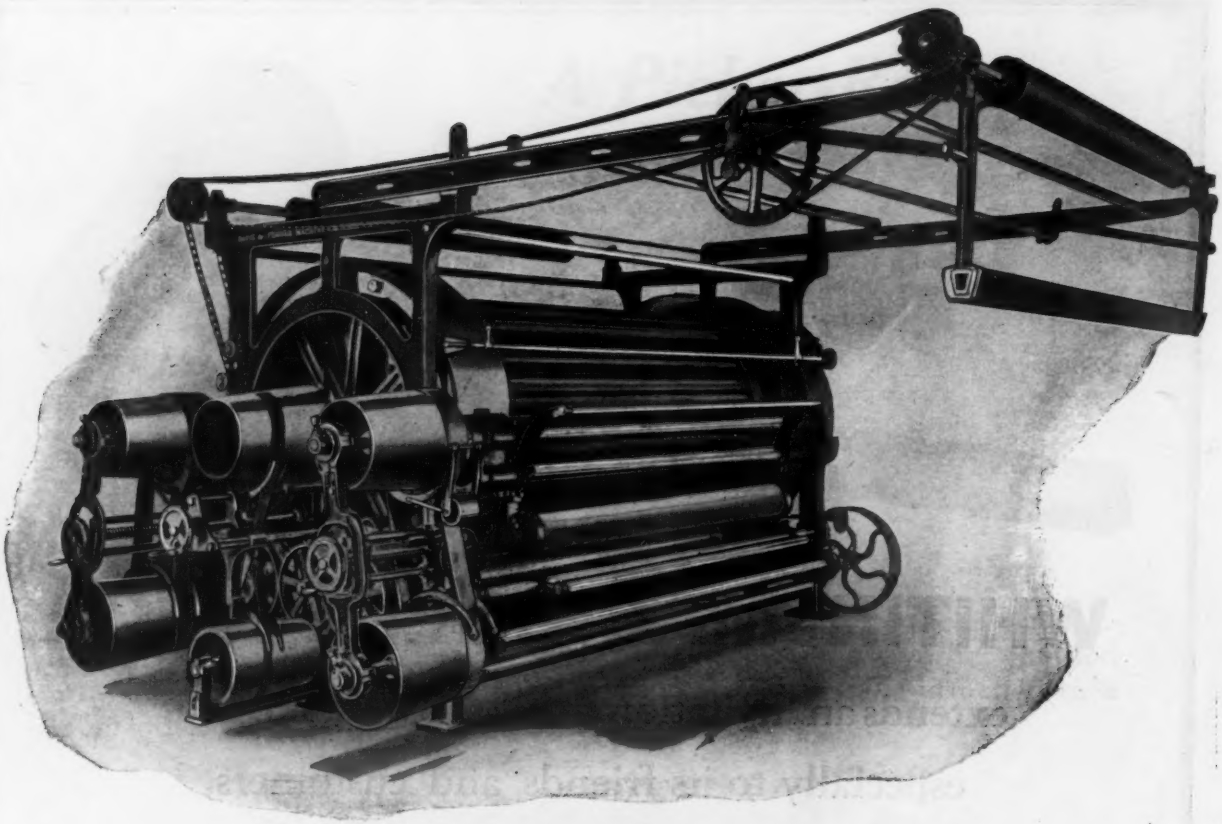
to visit its

Demonstration of Moving Machinery

at the Sixth Southern Textile Exposition

to be held

at Greenville, S. C., Oct. 20-Oct. 25



36 ROLL DOUBLE ACTING NAPPER FOR COTTON GOODS

THE DAVIS & FURBER MACHINE CO.

OF NORTH ANDOVER, MASSACHUSETTS.

ESTABLISHED 1832

For 92 years manufacturing the highest type of Textile Machinery for Wool, Worsted, Cotton Waste, Jute, Mohair, Asbestos, Flax Waste, Silk Waste and shoddy.

Its Cards, Mules, Nappers, Pickers, Dusters, Tape Condensers, Dressing Machinery, Card Clothing and Napper Clothing are the standard for America and are constantly being exported.

SPACES 112, 113, 114, 115 IN ANNEX
SIXTH SOUTHERN TEXTILE EXPOSITION
TEXTILE HALL, GREENVILLE, S. C., OCT. 20-25.

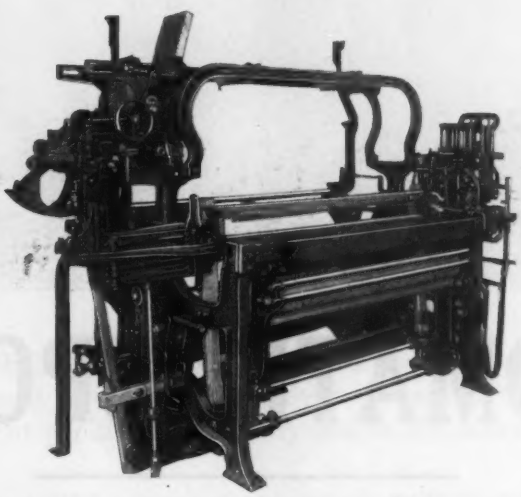
WORKS OF THE DAVIS & FURBER MACHINE CO.

Service—

Economy—

Profits—

When Using Automatic Magazine Dobby Looms for Fancy Weave Effects



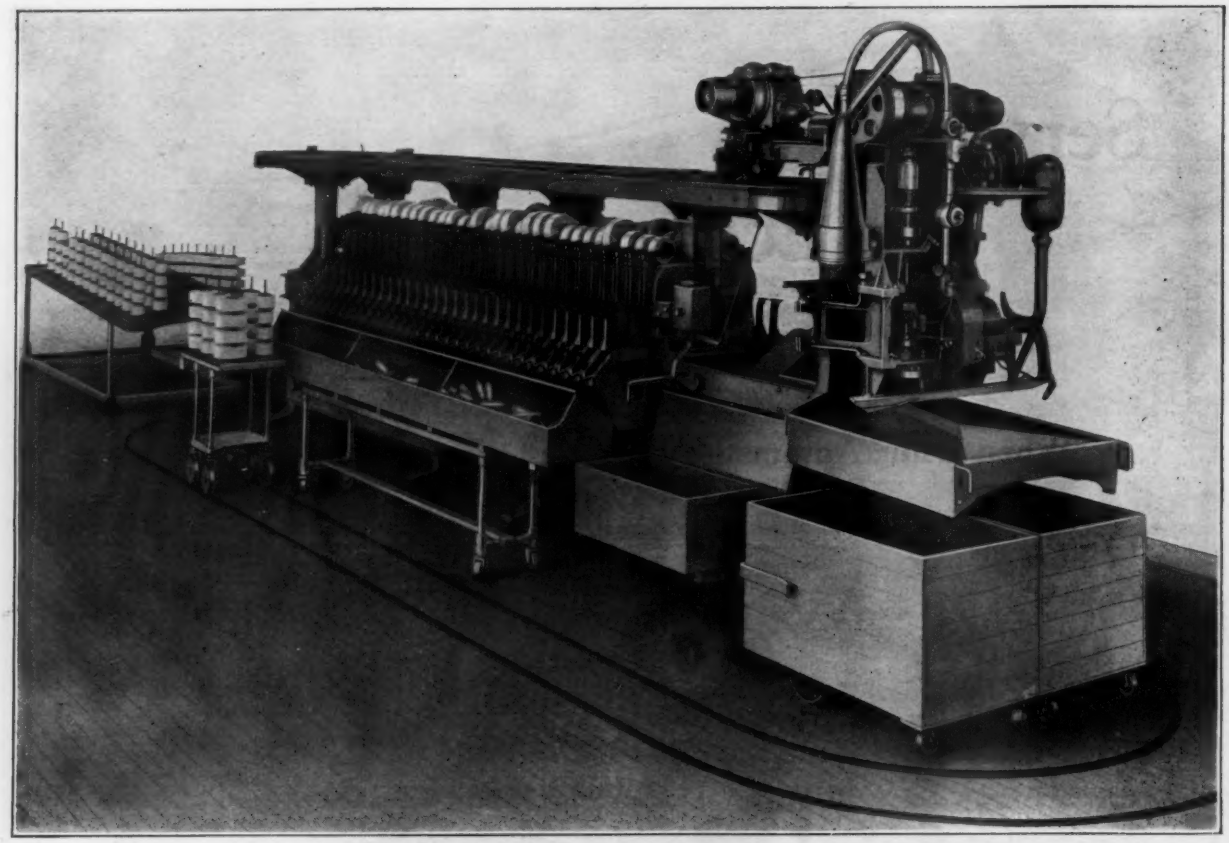
Crompton & Knowles Automatic Dobby Dress Goods Loom

CROMPTON & KNOWLES LOOM WORKS

WORCESTER, MASS.

PROVIDENCE, R.I. PHILADELPHIA, PA. PATERSON, N. J.

S. B. ALEXANDER, CHARLOTTE, N. C., SOUTHERN MANAGER



AUTOMATIC SPOOLER

HIGH SPEED WARPER

"EVERY KNOT A WEAVER'S KNOT"

SEE US AT THE

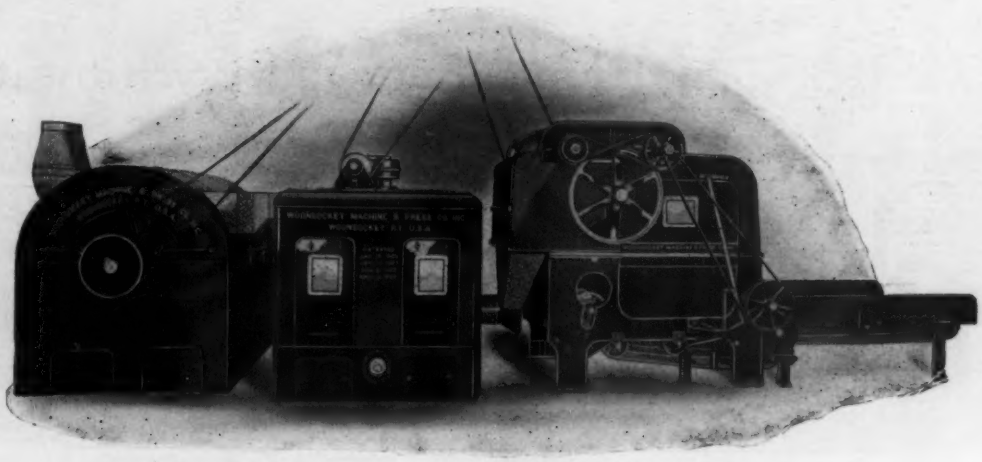
Southern Textile Exposition

Greenville, S. C., Oct. 20-25

BARBER-COLMAN COMPANY

WOONSOCKET

COTTON OPENING EQUIPMENT



HORIZONTAL CLEANER, VERTICAL OPENER AND BALE BREAKER.

Our policy of SPECIALIZATION has again brought out by actual tests the outstanding development in opening machinery, demanded by cotton manufacturers to meet the present conditions of costly cotton and labor.

This equipment installed in your opening room will thoroughly open and clean ordinary or high density bales of short or long staple cotton, without injury to the stock, without curling or rolling, without loss of staple, at the lowest labor cost; requiring the least power; with the smallest investment and installation expense.

You are cordially invited to inspect this equipment at the Southern Textile Exposition and compare the results of actual tests conducted under mill conditions. A complete mill equipment in operation will be exhibited for your further study.

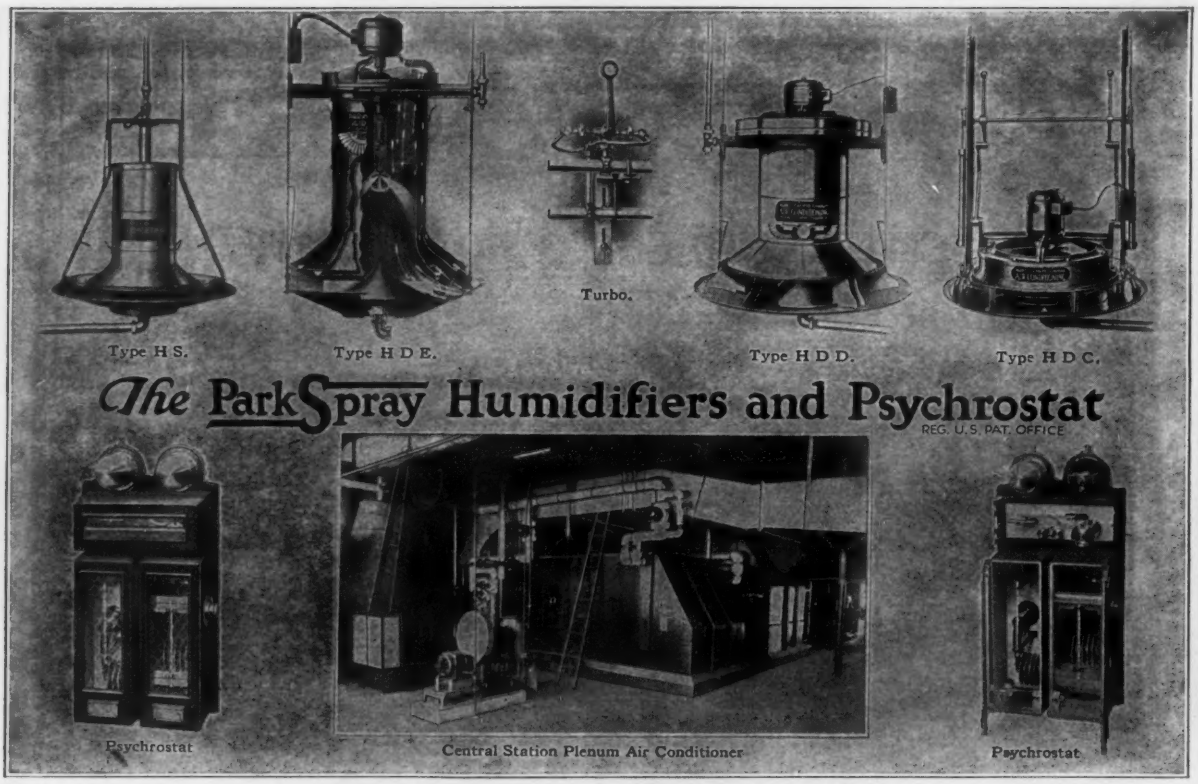
WOONSOCKET MACHINE AND PRESS CO., INC
OPENING AND PICKER ROOM, CARDING, DRAWING AND ROVING MACHINERY
WOONSOCKET, R. I.

J. H. WINDLE
Northern and Export Agent
PAWTUCKET, R. I.

FALES & JENKS MACHINE COMPANY
SPINNING AND TWISTING MACHINERY
PAWTUCKET, R. I.

J. H. MAYES
Southern Agent
CHARLOTTE, N. C.

EASTON & BURNHAM MACHINE COMPANY
SPOOLING, WARPING AND WINDING MACHINERY
PAWTUCKET, R. I.



Where Do Better Humidifying Results Come From?

WE did not discover humidity—the practice of supplying artificial humidity is as old as wetting floors. We do not lay claim to having discovered the laws that govern humidity—they are still in the making. We do not pretend to have been the first to attempt to supply the demand for humidifying devices brought about by variations of moisture content of the air.

¶ But since 1907 when this company (or its predecessors) entered the field, much definite knowledge of humidity has been acquired; the laws that govern humidity have been earnestly studied so that they are now better known. We think we can lay claim to having had some part in this.

¶ As time goes on more knowledge will be added. We expect to have a part in this, also—for we are constantly studying humidifying problems.

¶ Supplying the proper humidifying apparatus is a combination of science and of experience. Humidifying experience is cumulative. Humidifying practice and skill and knowledge are improving. Where do better humidifying devices come from if not from those who have studied hardest?

Parks-Cramer Company

Engineers & Contractors

Industrial Piping and Air Conditioning

Fitchburg Boston Charlotte

AT THE GREENVILLE SHOW
YOU CAN SEE OUR NEW

HIGH-SPEED

NORDRAY
AUTOMATIC LOOM

DO NOT ORDER
MORE LOOMS
UNTIL YOU HAVE SEEN IT
NO LONGER AN EXPERIMENT

HOPEDALE

MANUFACTURING COMPANY
MILFORD, MASS.

Southern Office at
GREENVILLE, S. C.

Howard Bros. Mfg. Co.

ESTABLISHED 1866

Home Office and Factory
WORCESTER, MASS.

E. M. TERRYBERRY, Southern Agent, Address Southern Branch office,
1126 Healey Bldg., Atlanta, Ga.

GUY L. MELCHOR, Assistant Southern Agent, Southern Branch Factory,
121 So. Forsyth St., Atlanta, Ga.

Cylinder and
Doffer Fillets
Napper Clothing
Stripper and
Burnisher Fillets
Emery Fillets

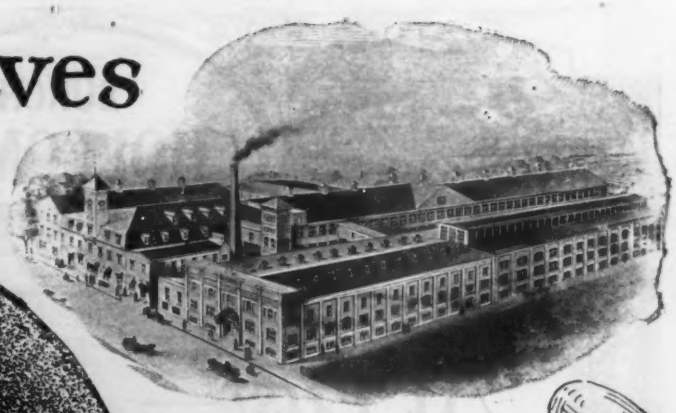
Top Flats and Lickerins Recovered and
Promptly Returned

Our equipment for
Glass Hardened Point Wire
is the most up-to-date.

Tempered Steel Twin and Domestic Iron Wire Heddles

The Best Materials Obtainable Make Up Our Products

Quality Leaves It's Mark



THE name "Emmons" has left its imprint on the textile world as the mark of quality in loom harness and reeds. Cheapness for cheapness' sake has been avoided, but by giving maximum quality at a fair price, the business of this institution has grown until today the Emmons Loom Harness Company is the largest manufacturer of loom harness and reeds in America.

There are few mills in this country who do not use one or more Emmons Products. To these users they need no introduction—their high quality, reliability and serviceability having made a lasting impression.

To the other few who may be seeking better grade products at a fair price, we offer service and satisfaction which they have not experienced elsewhere.

Write "Emmons" on your next order. Write us for prices.

EMMONS LOOM HARNESS CO., LAWRENCE, MASS.

Largest Manufacturers of Loom Harness and Reeds in America

Southern Representative: Geo. F. Bahan, Charlotte, N. C.

EMMONS PRODUCTS

COTTON HARNESS
MAIL HARNESS
SELVEDGE HARNESS
REEDS
SLASHER AND STRIKING COMBS
WARPER AND LIECE REEDS
BEAMER AND DRESSER HECKS
MENDING EYES
JACQUARD HEDDLES, ETC.

Sole Agents for Wardwell Pickers

EMMONS
LOOM HARNESS AND REEDS

BUNCH
HOLCOMBE
BUILDER

At Last—

A *Fool-Proof Bunch Builder That Saves 80% of the Waste*

Before Installation Holcombe Bunch Builder 50 yds. of waste

After Installation Holcombe Bunch Builder 10 yds. of waste

The Holcombe Automatic Bunch Builder is the result of years of experimental work by a practical mill man. It is fool-proof—has no wearing parts to get out of order or wear out—requires no attention of the operator for setting or resetting—needs no oil. What else could you ask of a bunch builder?

The Holcombe Bunch Builder builds the bunch automatically only when the ring rail is lowered to doff.

Save 80% of the waste by installing

HOLCOMBE
Automatic Bunch Builders

in your mill. They are fully perfected and are giving excellent service and results to mills throughout the South. Over 2,000 installations now operating.

THE HOLCOMBE AUTOMATIC BUNCH BUILDER will be on display at the coming sixth Southern Textile Exposition to be held at Greenville, S. C., Oct., 20th to 25th. Mr. H. H. Holcombe will be present at our exhibit, located at booth number 205 and will be most pleased to demonstrate the construction and operation of the Bunch Builder, and to discuss with you your individual yarn waste problems.

Get in touch with Mr. Holcombe for our proposition on this wonderful device.

In view of comprehensive patent protection granted, any infringement will be vigorously prosecuted.

Holcombe Bunch Builder Co.
Birmingham, Ala.

51 Years' Success

1873 1924

Spinning Rings Twister Rings
Silk Rings Traveller Cleaners
Traveller Cups GuideWireSets

The Best That Experience Can Produce-That Money Can Buy

Whitinsville Spinning Ring Co.

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"SONOCO" Burnished Nose "Yarnsaver"

The Sonoco Surface **Catches the Yarn** at the First Turn

You may take your choice:

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are made With or Without the Cushion:

They are Uniform, Balanced and Fit the Mandrels Perfectly, assuring handsome packages that unwind without a "hitch"

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Loom and Section Beam Heads

Cannot Break
Do not Bend

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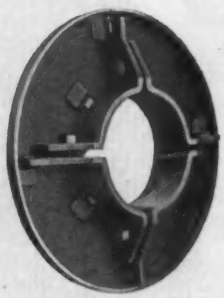
Replacement of broken heads and new equipment.

Absolutely guaranteed unbreakable. Will not bend or spring in warping or in handling.

Construction is such that your cast iron head can be duplicated in detail.

"ALL STEEL" LOOM BEAM HEAD
"MALLEABLE" GEAR
Patent Pending



"ALL STEEL" ADJUSTABLE HEAD
SPLIT OR SOLID TYPE
PATENT PENDING

Send us sample of your cast iron head and ask for samples of All-Steel to replace.

Guaranteed not to bend or spring under the pressure of the yarn or in the usual handling and transportation.

Made in all standard sizes. Suitable for beaming when so specified.

Elastic and Non-Elastic Beam, Steel Headed Jack Spools, "High Speed" Braider Carriers, Braider Bobbins, "New Process" Drop Wires.

Ask for Samples.

"ALL STEEL" SECTION BEAM HEAD
PATENTED

Mossberg Pressed Steel Corporation

Attleboro, Mass.

Growth A Tribute To Worth

1883

1924

THE reputation of "High Grade" quality was established forty years ago and has been maintained throughout the years until today our "High Grade" products are demanded and used by the leading textile mills throughout the entire country. The combined organizations at the main plant in Lawrence, Mass., together with three big stock plants in Maine, New Hampshire and Vermont, altogether operating hundreds of skilled workmen, each one of whom takes pride in upholding the reputation established forty years ago, assure textile mills of the most dependable and economical products of their kind to be obtained.

We specialize in complete new mill equipment of Bobbins, Spools, Shuttles, Skewers, etc.

"High Grade" Products include:—Plain and Automatic Loom Shuttles, Warp Bobbins, Filling Bobbins, Card Room Bobbins, Plain and Metal Head Warper and Twister Spools, Automatic Loom Bobbins, etc. Particular attention is called to our bobbins and spools fitted with special metal shields of all types and kinds, also to enamel finish in any color.

THE DAVID BROWN CO.

"High Grade" Bobbins, Spools and Shuttles

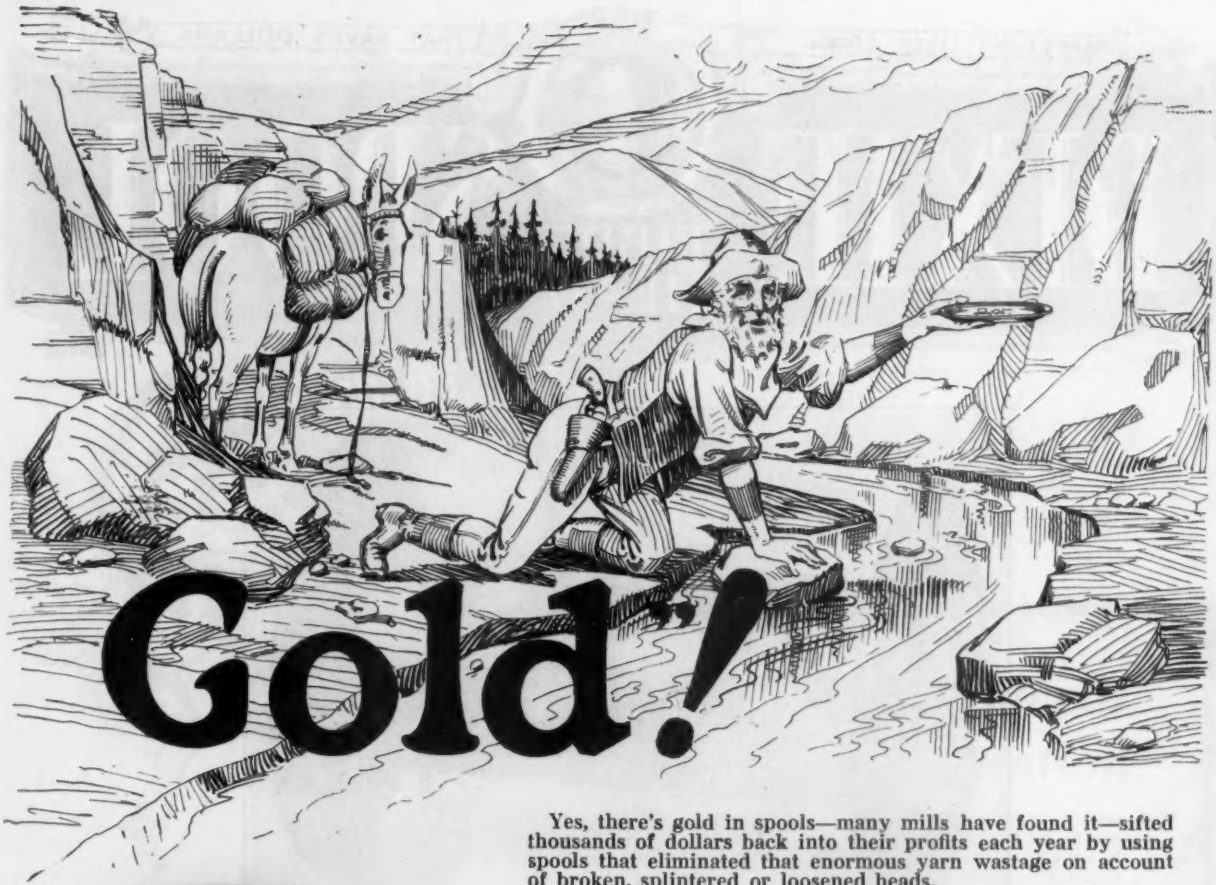
David M. Brown, President — LAWRENCE, MASS. — George Gibson Brown, Treasurer

PANAMA-PACIFIC EXPOSITION THE DAVID BROWN CO. LAWRENCE GOLD MEDAL MASS. U.S.A. BOBBINS-SPOOLS-SHUTTLES SAN FRANCISCO-1915-CALIFORNIA

MASS. CHARITABLE MECHANICS ASS'N UNION SHUTTLE CO. LAWRENCE SILVER MEDAL MASS. U.S.A. POWER LOOM SHUTTLES BOSTON-1884-MASS

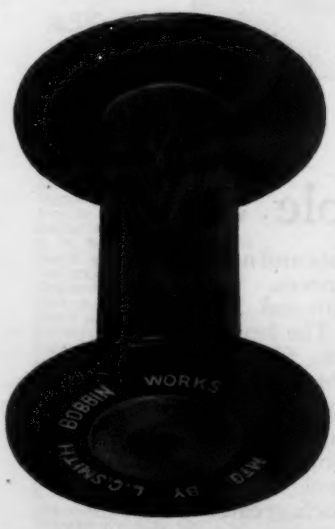
The David Brown Co.

Lawrence, Mass.



Yes, there's gold in spools—many mills have found it—sifted thousands of dollars back into their profits each year by using spools that eliminated that enormous yarn wastage on account of broken, splintered or loosened heads.

Every broken spool means a yarn wastage amounting to from forty to sixty cents a spool, and the mill using fifty thousand ordinary spools is losing on the average of from $4.000.00 to $6,000.00 a year.



Smil-Bob Indestructible Fibre Head Spools are "gold" to the mill who has been using ordinary spools. Their smooth, hard, vulcanized red fibre heads will not break, chip, splinter or come off. They last five times longer than ordinary spools which means a worth-while saving in replacement charges alone, not to speak of the enormous savings in yarn, and time. Their perfect balance and long lasting barrel makes them turn true throughout a long life.

Invest in Smil-Bob Spools—you can't lose. They are truly the last word in perfect spool construction, and the L. C. Smith Bobbin Works reputation stands back of them.

Ask today for full information.

L. C. SMITH BOBBIN WORKS

PHILLIPSBURG, N. J., U. S. A.

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Southern Office: 201 Augusta St., Greenville, S. C., M. C. Sanders, Manager.
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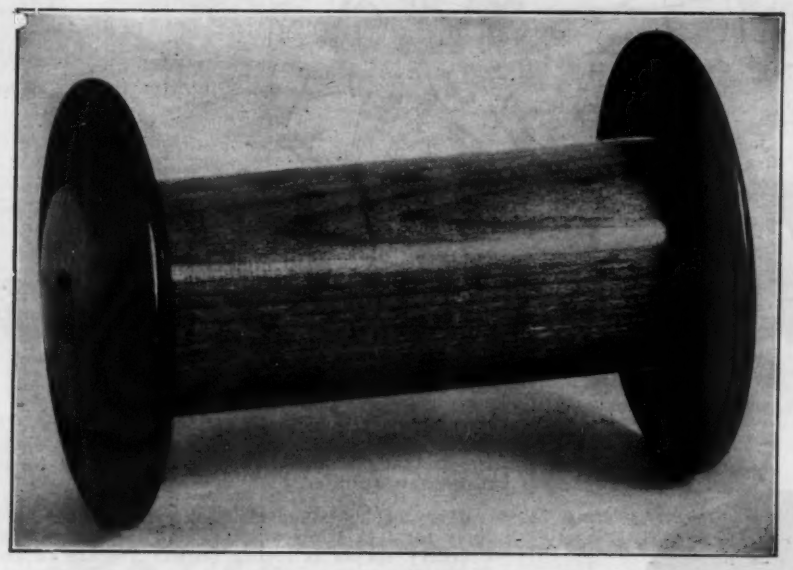
Indestructible

SMIL-BOB

Fibre Head SPOOLS

THE LONG-LIVED SPOOL THAT SAVES DOLLARS

DIXIE FIBRE HEAD SPOOL



It's Here—
Perfection in an Indestructible Spool

Spool breakage has always been a source of waste—wasted time and money, and in many instances the cause of injury to workmen.

All of this loss is now preventable with the New "DIXIE" Fibre Head Spool, as it is practically indestructible. It will stand harder knocks and give you longer service than many improved spools now on the market.

The "DIXIE" spool is the result of hundreds of experiments and much research work by our engineers. It is the final result of the improved indestructible fibre head spool. The head is made of vulcanized hard rag fibre and is practically indestructible.

Compare the "DIXIE" with the spools you are now using and you will find that it is possible for you to get them in the same size and weight as the all-wood spools—and of much greater length of life.

Write today for a sample

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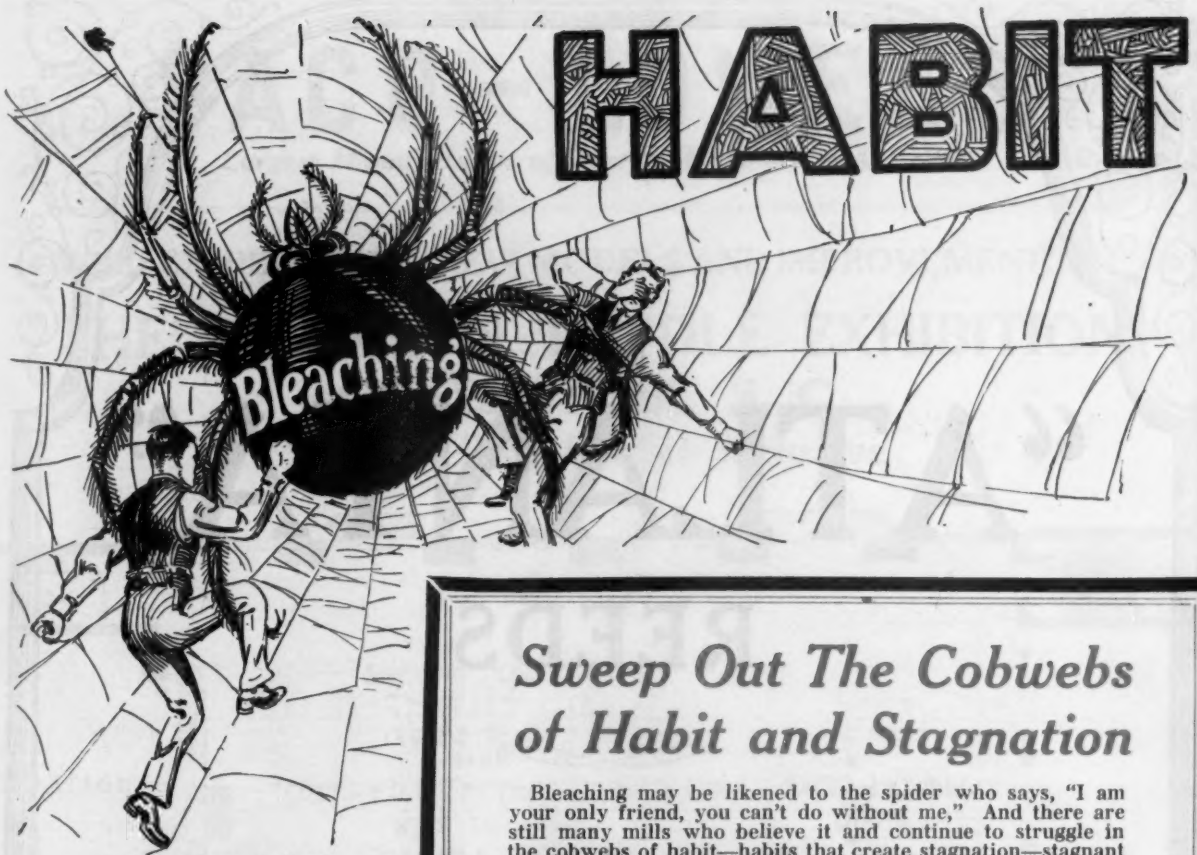

ASK THE MAN WHO USES IT

Here's A Few Of The Many Users Of The "Auto-Gyp" Method

Adrian Knitting Co.
Allen A Company
Atlas Underwear Co.
Augusta Knitting Corp.
Avalon Knitwear Co.
Bailey Knitting Mills
S. D. Bausher & Son, Inc.
Blood Knitting Co.
Cartersville Mills, Inc.
Chalmers Knitting Co.
Cooper Underwear Co.
Eagle & Phenix Mills
Excelsior Mills
Fuld & Hatch Knitting Co.
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Lawrence Mfg. Co.
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A. V. Morris & Sons
Munsingwear Corp.
Maline Mills
Oneita Knitting Mills
Piqua Hosiery Co.
Paducah Hosiery Co.
J. C. Roulette & Sons
Superior Underwear Co.
Taunton Knitting Co.
Taylor-Bramley Co.
Tremont & Suffolk Mills
Union Mills, Inc.
Union Underwear Co.
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SURPASS CHEMICAL CO. INVENTORS AND MANUFACTURERS OF DYEING AUTOGYP PATENTED IN U.S.A. AND CANADA ALBANY N.Y.

Sweep Out The Cobwebs of Habit and Stagnation

Bleaching may be likened to the spider who says, "I am your only friend, you can't do without me," And there are still many mills who believe it and continue to struggle in the cobwebs of habit—habits that create stagnation—stagnant methods that waste time, money and labor.

Sweep out the cobwebs in your finishing room. Bleaching is no longer necessary in finishing your products. Why allow it to pose as an ally and waste time and money? Why allow a habit—an unnecessary habit—an old-fashioned, expensive habit.

Bleaching is no longer necessary because the modern AUTOGYP Method of Dyeing bleaches your product while it is dyeing. It dyes and bleaches uniformly in one operation where it formerly took 7 operations. It saves 3½% shrinkage — it saves 25% of tensile strength—it saves 50% of steam—it saves 30% of labor and 90% of water, and it saves all the chemicals used in the chloride of lime method. It saves boiling out in kiers and disagreeable bleach methods with their attendant danger of weakening and tendering the fibre.

The AUTOGYP Method of Dyeing produces a better looking fabric with a better feel, and assures perfectly level, evenly dyed, and perfect uniformity of shades.

No special equipment or appliances required, and no special skill necessary.

These are not idle claims—ask any of the many users of AUTOGYP, and there are many of them—mills that have swept out the cobwebs of habit in their finishing room and are making important savings with the AUTOGYP method.

If you want to be further convinced, we will be glad to make a test with your own material, under your own conditions, with your own equipment in your own mill and at OUR EXPENSE.

At any rate, may we forward you full details? Drop us a line today.

SURPASS CHEMICAL CO., ALBANY, N. Y.

AUTO GYP
Process of Dyeing

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Largest Manufacturers of Textile Machinery in America

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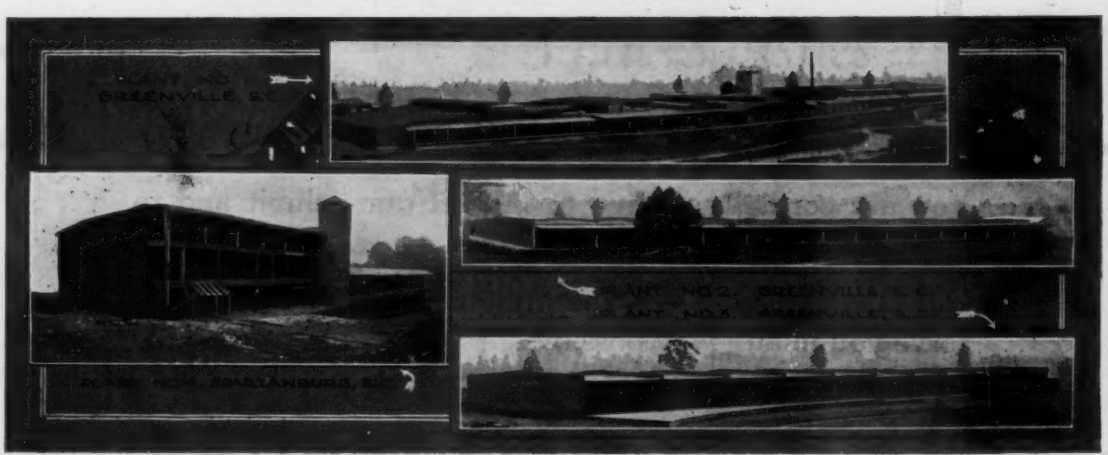

OVER 500,000 bales of cotton are consumed annually within a radius of 50 miles of this Warehouse.
Situated in the midst of the great Cotton Manufacturing district of the Carolinas.
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Good Working Conditions Are Not Buried Beneath Ash Heaps and Dirt

Wise executives and superintendents strive in every way to improve working conditions for their employees. Better surroundings keep men happy at their work, which means that increased production is sure to follow. Almost every effort in this direction is good, yet it is certain that in most factories, inside conditions have been bettered, but the outside has been neglected.

How can working conditions really be good, with the grounds of the establishment covered with junk and litter? Really GOOD things are good INSIDE and OUT! Many factory and mill executives intend to have outside conditions bettered, but because of urgent business the matter is neglected, the intention is good, but time slips along, and before you know it, planting time has passed. Routine matters are finished first, simply because planning better grounds is outside the customary business of the day.

Improved Surroundings Come From Thoughtful Plans

Let us do the planning for you. Just send us a word or two of your intentions, and an expert from our landscape department will come to your assistance. He can tell you what should be planted and what the finished effect will be. There is no bother, there are no unsatisfactory results because things don't turn out as expected—we know what to expect. The service we give is remarkably complete and efficient.

Our catalogue illustrates much of our work, but of course is not able to present adequately the results of extensive layouts. The work illustrated shows chiefly what has been done to improve private grounds. Factories and mills are even more in need of improvement and this catalogue will give you an idea of the possibilities. Send for it today, and make an appointment with our landscape department.

J. VAN LINDLEY NURSERY COMPANY

Pomona, North Carolina

J. L. BUSSEY & CO.

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Someone will be on hand to make you welcome and in as much as Mr. Wilson is Chairman of the Vistors' Committee it will be the pleasure of any of the Wilson organization to serve you in any way possible.

Walk right in and make yourself at home whether there is anyone in the booth or not. You are welcome always.

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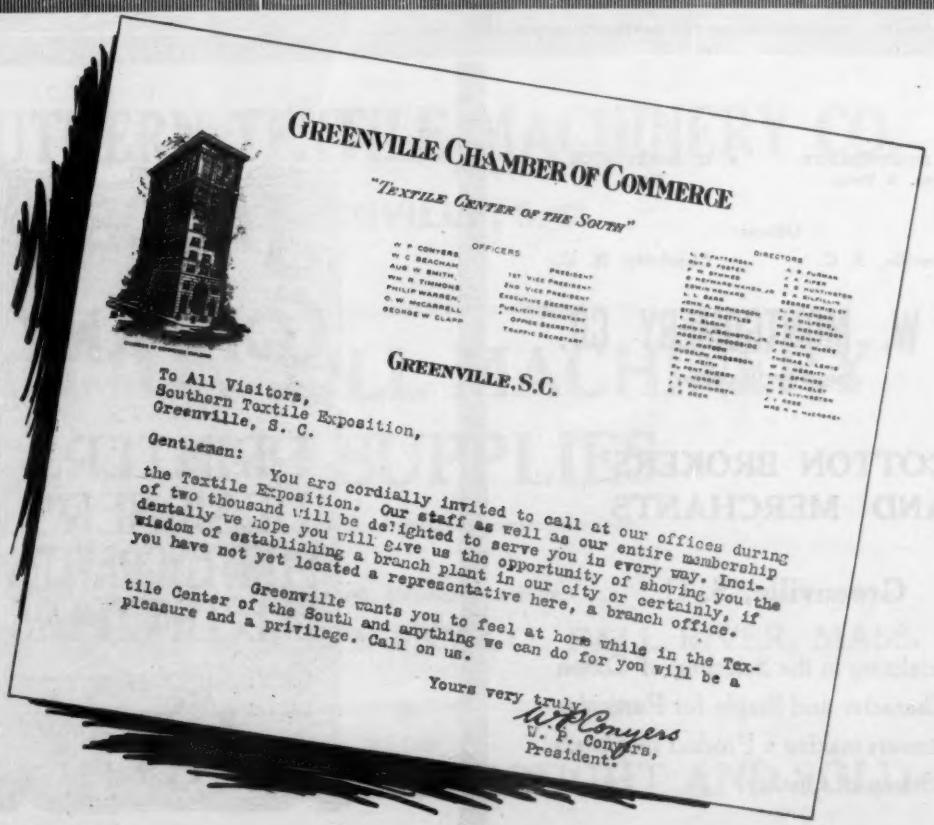

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Southern Textile Exposition,
Greenville, S. C.

Gentlemen:

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Greenville wants you to feel at home while in the Textile Center of the South and anything we can do for you will be a pleasure and a privilege. Call on us.

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—"in my 19 years of mill experience, your belts have proven superior to all others!"

So writes the superintendent of a large mill in North Carolina—name on request.

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BETTER BELTS

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will reduce your annual belting expense just as they have for other practical mill men who demanded

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"NOTHING TAKES THE PLACE OF LEATHER"

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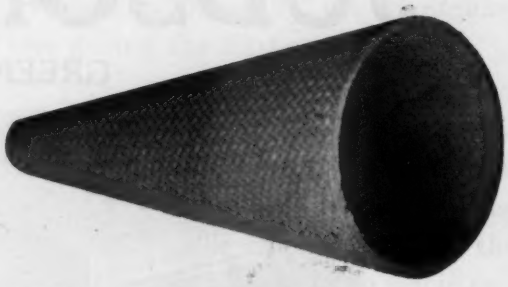

The Lap Comes All the Way to the Edge

In the "Economy" Cones, the lap inside comes all the way to the edge of the cone, which insures equal strength and equal thickness all the way round which in turn makes it fit better with no chance of wobble.

"Economy" Cones have a smooth round polished nose. They can also be furnished with square nose if desired.

Ask today for sample or prices.

Economy Cone & Tube Co.

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Also manufacturers of

PARALLEL TUBES AND CLOTH WINDING CORES

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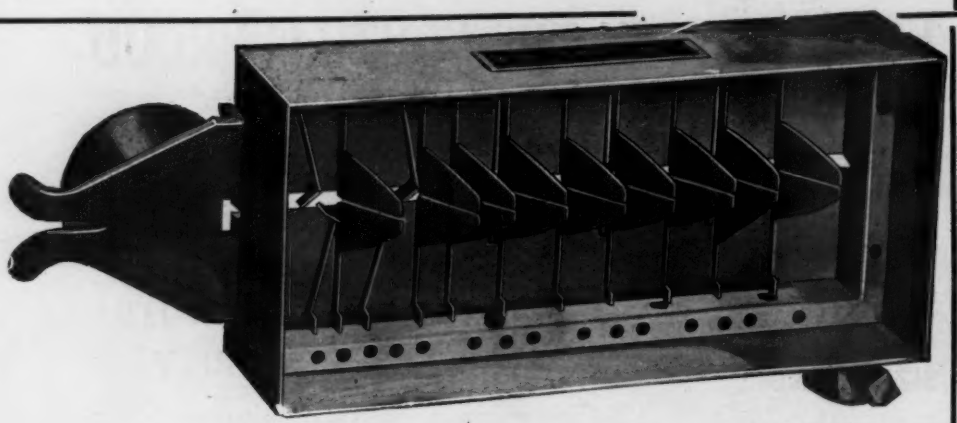

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Automatic Yarn Cleaner

At the Southern Textile Exposition We Will Show

THE "ECLIPSE" AUTOMATIC YARN CLEANER—a small, compact and easily attached device which automatically removes dirt, sand, slugs, bunches and all foreign matter from the yarn. It eliminates piecing, threads easily and instantly and does not affect the strength and elasticity of the yarn.

THE "ECLIPSE" SLUB CATCHER AND TENSION DEVICE—entirely new in principle and operation. A new tension design has been attached to allow a change from warp to filling winding. Used successfully on both spoolers and winders. Adjusts itself to any size yarn, cotton, silk or wool.

THE "ECLIPSE" AUTOMATIC STOP MOTION DEVICE with many radical improvements. It is something new and revolutionary in its principles. The mechanical construction has been so simplified that it is now easier than ever to operate. The spinning and twisting trade is invited to examine this improved device.

THE "ECLIPSE" VAN NESS DYEING MACHINE which random dyes cotton, wool or silk yarn on the cone by injecting the dye into the cone under pressure.

We will consider it a favor if you will call at our booth and let us show you these devices.

ECLIPSE

ECLIPSE TEXTILE DEVICES, INC.

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Automatic Yarn Cleaners
Eclipse
Yarn Tension Devices

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We are also makers of the famous Eclipse Bendix starter for automobiles and the time proven coaster brake for bicycles.

Eclipse
Automatic Stop Motions
Van Ness
Random Dyeing Machines

TEXPRO Roving Bobbins

HERE is a Roving Bobbin designed and constructed to produce better results and to effect economies in operation.

TEXPRO Bobbins are made of Cast Pulp and are but half the weight of wooden bobbins, yet they possess great strength and rigidity. They cannot split, crack or warp and they will withstand a vast amount of rough usage and abuse.

TEXPRO Cast Pulp Roving Bobbins are specially processed in a manner which makes them impervious to atmospheric conditions and at the same time adding strength and durability.

Note the Ferrule: It is made of metal and assembled to the Cast Pulp form. It can not come loose and it engages readily to the driving pin. The use of this Ferrule means lasting strength to the bobbin. The lugs at the base will not break because of hard usage, accidental dropping or other abuse.

This metal Ferrule, as you will see by the illustration, extends up inside the base of the bobbin and thus withstands the great wear that unprotected other type bobbins are subjected to at this point.

TEXPRO Cast Pulp Roving Bobbins mean more efficient operation, freedom from many bobbin troubles and longer bobbin service. They are made to fit all standard frames.

Send for sample TEXPRO Cast Pulp Roving Bobbin. Examine it carefully, put it to work. You will at once recognize its many superior qualities.

Mfd. Under Drake Patents.

THE TEXTILE PRODUCTS CO.
HARTFORD, CONN.

Patents Pending

TEXPRO BOBBINS
—cost less and last longer

TEXPRO cast pulp **BOBBINS**

ISAAC HARDEMAN REALTY BLDG., CHARLOTTE, N. C.

Sturtevant PUTS AIR TO WORK

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Mechanical Hot Blast Heaters, Generator Cooling Sets, Air Washers, Autoforce Ventilators and all types of STURTEVANT reliable Heating and Ventilating equipment for foundries, factories, theatres, stores and all commercial and industrial buildings. We will be pleased to call and talk over your individual requirements.

Sturtevant PUTS AIR TO WORK

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Sturtevant Pneumatic Conveying and Collecting Systems are especially useful in cotton, wool, shoe, glass, fur and woodworking industries.

They rid the air and machinery of dust, and dirt, speed up production, maintain a clear healthy atmosphere and make working conditions better for employees.

We do not hesitate to recommend Sturtevant Conveying and Collecting Systems, in fact, we will be pleased to call at your request and show you the advantages of these systems.

Sturtevant PUTS AIR TO WORK

STATIONARY AND PORTABLE VACUUM CLEANERS

Every industrial executive has undoubtedly heard how efficiently and economically the Sturtevant Stationary Vacuum Cleaner keeps—free from dust and dirt—the floors, walls and machinery, in industrial establishments.

If you have not already installed one of these cleaners we feel sure that you will profit by asking us to call and show you its advantages.

We also recommend the Sturtevant Portable Vacuum Cleaner for use in offices, homes, shops, etc. No obligation to you in asking us to call.

Sturtevant PUTS AIR TO WORK

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Mechanical Draft Apparatus, Turbines, Motors, Cindervanes, Economizers, Transmission Gears, Automatic Stokers.

We are always glad to co-operate with power plant executives in planning improvement in their operating conditions.

We recommend Sturtevant, Guaranteed, power plant equipment.

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As simple as a Beam Scale —And Just as dependable

It will be worth your while to investigate the advantages of the Craig System of "Better Draft Control."

The Craig Draft Regulator is fundamentally a beam scale which automatically weighs the slightest change in over-fire draft.

In weighing the change it moves a sleeve valve which controls a hydraulic ram.

The ram in turn operates the damper, blast gate, or other unit under control, automatically maintaining the proper furnace draft.

A post card will bring you our interesting bulletin "Better Draft Control," and if you wish, prices on the regulator shown above, or on our complete system of combustion control.

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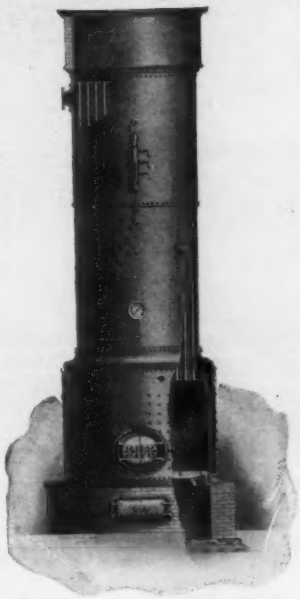
GOULDS

Southern Selling Agent for the Products on This Page—Quality Products plus "Hardeman Service"

The High Pressure Boiler That Saves Fuel, Floor Space and Labor

The vertical tubular type of boiler has long been preferred by the "old heads" in the steam plant, especially in the New England States, because with this type of boiler there is less floor space required, less grate surface and less fuel required.



Lately there has been an increased demand for this type of boiler due to the call for higher steam pressures and also to the increasing use of steam turbines requiring superheated steam for their economical operation.

These Vertical Tubular Boilers combine all the best features of the Vertical Tubular Boiler. In the arrangement of heating surface, grate surface and passage of gases we have embodied in our design proportions which practice has proven correct.

The illustration shows our Standard Manning Type. Provision is made for cleaning the crown sheet through a series or handholes arranged to come opposite alternating rows of tubes so that it is possible to reach every part of the sheet.

We build vertical tubular boilers in the Straight Shell Type and the Tapered Course Type, both of which are perfected to the last degree and are giving satisfaction to every user. They are built to meet all the rigid requirements of the Massachusetts Board of Boiler Rules and the ASME Code. Materials and construction live up to the reputation of all International products.

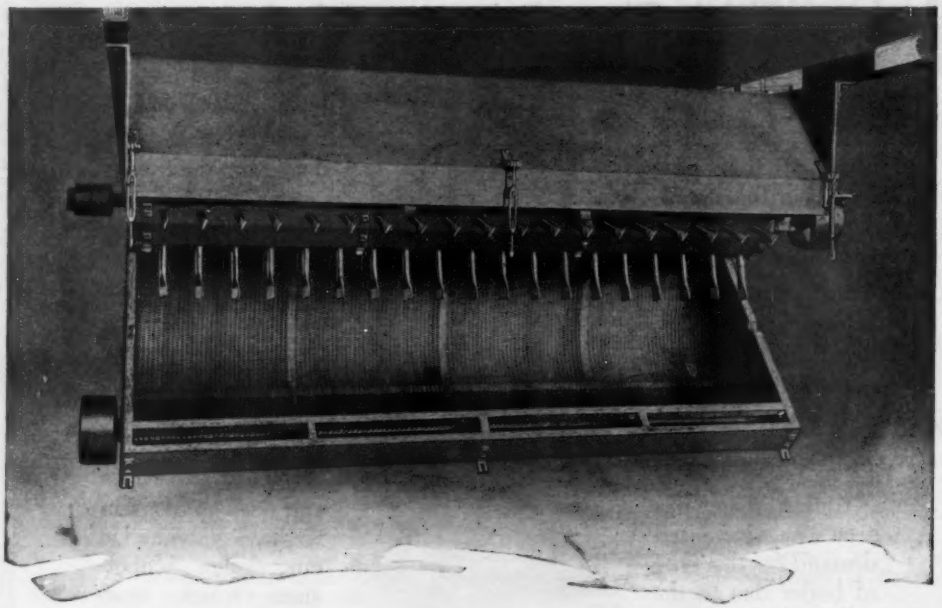
We also manufacture Horizontal Return Tubular Boilers, Water Tube Boilers, Brady Scotch Boilers, Smith Door Protectors, Macdonald Shaking Grates, Special Plate Work, etc.

Write today for a Catalog. Every engineer should keep a copy for reference.

INTERNATIONAL ENGINEERING WORKS, Inc.
FRAMINGHAM, MASS.

Southern Representative,
Isaac Hardeman, Charlotte, N. C.

BOSTON
PHILADELPHIA
NEW YORK
SAN FRANCISCO



Put Your Conveyor Pipe to Work

You can give your cotton a thorough cleaning, opening and aerating, while it's being conveyed from the bale breakers to the picker room. The Murray Cotton Cleaning and Aerating Machine forms a part of the conveyor pipe, and vastly improves the stock before it is fed to the pickers.

The "Murray" takes up very little extra space since it can be hung from the ceiling. Its supply of cotton is drawn through it by the suction of the conveyor pipe fan, no additional fan or increased draft being necessary. A further economical feature is the fact that the "Murray" requires practically no attention since the dirt is automatically disposed of through a chute at one end.

Handles 2,500 Lbs. Hourly.

2,500 pounds of cotton per hour can be cleaned, opened and aerated in the Murray machine at a power expenditure of only 3 to 5 H.P. The stock is given a thorough treatment by 114 revolving arms.

The Bowling Green Spinning Mills write us stating "The Opener we purchased from you is giving entire satisfaction in every way. In fact we think it is a wonderful machine."

THE MURRAY COMPANY, ATLANTA, GA.

Northern and New England Sales Representatives:
Aldrich Machine Works
P. O. Box 132, Providence, R. I.

Carolina Sales Representatives:
Carolina Specialty Co.
Brevard Court
Charlotte, N. C.

The Murray
(PAT. PENDING)
COTTON CLEANING AND AERATING MACHINE

COTTON WELL OPENED IS HALF SPUN

A Service For Small Plants

Recently we were commissioned to build an addition to a mill. The addition was small. In engineering parlance, it was a "2 x 4" job. But that little "2 x 4" job received the unreserved attention of an organization keyed to the larger engineering jobs of the country.

It was a big job, too, compared with those we later did for this same mill. We built a fire-proof vault, and a garage. We rearranged the sanitation facilities, and planned a more efficient arrangement of the offices. We supervised numerous repairs and improvements to buildings and equipment.

All this work was done as an incidental to the regular duties of the engineer on the job. There is no job too small or too large for Lockwood, Greene & Co. Whatever the service may be, either for existing plants or in building new ones, Lockwood, Greene & Co. will bring to it the mature experience of one of the oldest textile engineering organizations in existence.

Send for a copy of "Building with Foresight," a booklet which shows pictorially some of the work done by Lockwood, Greene & Co.

LOCKWOOD, GREENE & CO.
ENGINEERS

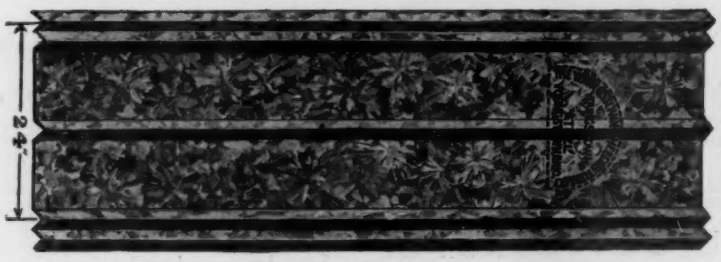
EXECUTIVE OFFICE, 24 Federal Street, BOSTON, MASS.

BOSTON · NEW YORK · CHICAGO

DETROIT · ATLANTA · CLEVELAND · CHARLOTTE · SPARTANBURG

Lockwood, Greene & Co. of Canada, Limited, Montreal.

Metal Roofing and Siding



In the erection of industrial buildings the most satisfactory material for roofing and siding is good steel. It is quickly erected, affords protection against fire and has a high salvage value. Experience has shown, however, that steel sheets used for this purpose must be of good quality and full weight if they are to give dependable service.

"Youngstown Sheets"

may be depended upon in this respect. They are always full weight, both in body and coating, and are rolled from steel specially made for this purpose in our own works. Careful attention to every operation, with thorough inspection at all times, assures in them a uniform quality seldom equalled.

For uses in which exceptionally long life is desired, we recommend

Copperoid Steel Sheets

They cost a trifle more than ordinary sheets, but will outlast other forms of iron and steel, some of which are sold at a much higher price.

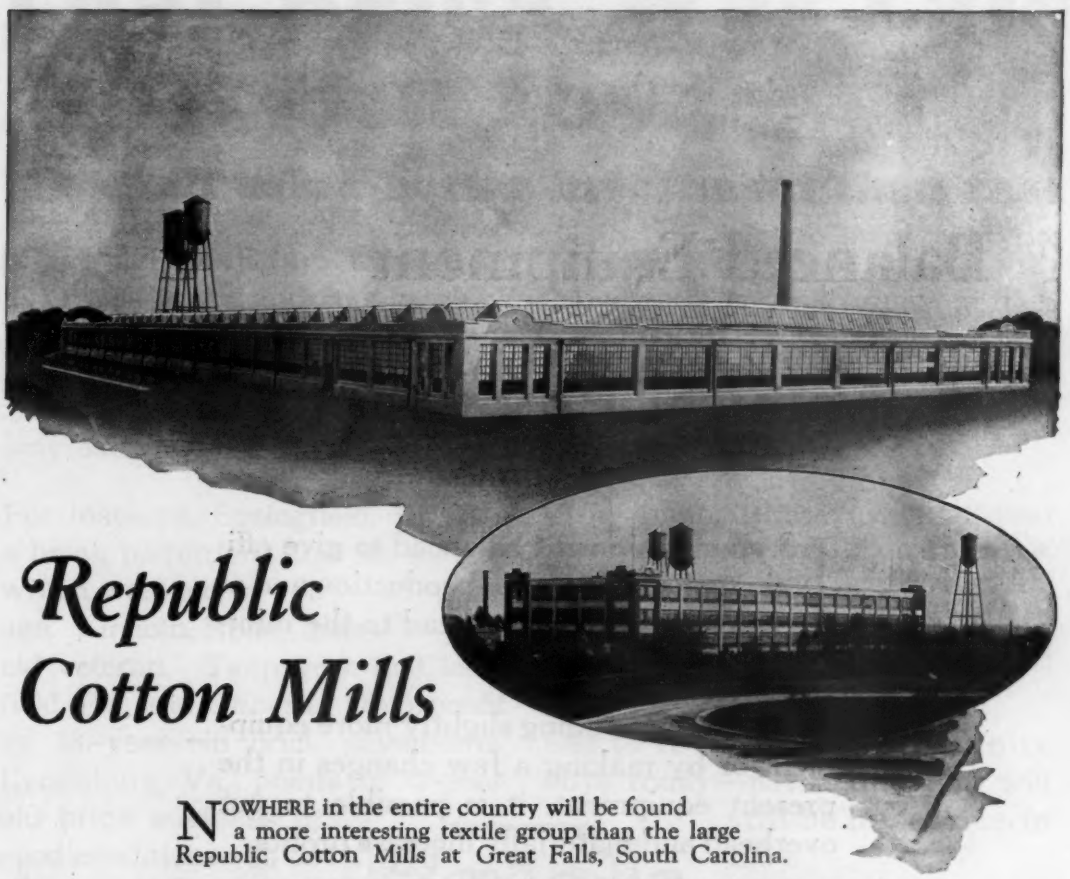
"Youngstown" Sheets may be had in either Steel or Copperoid Steel, and in all standard forms of corrugating, as well as in the most popular forms of roofing. They are carried in stock by leading jobbers in all parts of the country.

The Youngstown Sheet & Tube Company

YOUNGSTOWN, OHIO

DISTRICT SALES OFFICES

BOSTON—Massachusetts Trust Bldg.
NEW YORK—Hudson Terminal Bldg.
PHILADELPHIA—Franklin Trust Bldg.
ATLANTA—Healey Bldg.
PITTSBURG—Oliver Bldg.
CLEVELAND—Union Trust Bldg.
DETROIT—First Nat'l Bank Bldg.
CINCINNATI—Union Trust Bldg.
CHICAGO—Conway Bldg.
ST. LOUIS—Post Dispatch Bldg.
DENVER—First Nat'l Bank Bldg.
DALLAS—Magnolia Bldg.
SAN FRANCISCO—Sharon Bldg.
SEATTLE—Central Bldg.
KANSAS CITY, MO.—Commerce Bldg.
MINNEAPOLIS—Andrus Bldg.
NEW ORLEANS—Audubon Bldg.



Republic Cotton Mills

NOWHERE in the entire country will be found a more interesting textile group than the large Republic Cotton Mills at Great Falls, South Carolina.

In a setting of unusual natural beauty lies a pleasing little city of over 5,000 inhabitants, built and maintained by the Republic Cotton Mills for employees and their families. There are tree-lined, paved streets with miles of cement side-walks; modern well-equipped schools; operatives' homes of diversified architecture, a bank, moving picture theatre and food and department stores.

From its start, fifteen years ago, the Republic Cotton Mills has experienced almost perfect labor conditions; in fact the contentment and efficiency of employees has been a marvel to visitors well versed in the textile business and its problems. The profitableness and rapid growth of this undertaking are evidence of the kind of management it has enjoyed.

In 1909, this organization of Engineers was retained to assist in planning Republic No. 1 and the necessary village development. Since then have followed Republic No. 2 and the recently completed Republic No. 3, each addition calling for an expansion of the municipal equipment.

A clearer picture of our service to Industry will be found in the new and revised editions of "Picks to the Minute" on the textile field, "Factories for the Future," and "Contentment under Roof,' on industrial villages; now ready for distribution.

J. E. SIRRINE & COMPANY

Engineers

Greenville South Carolina

SERVICE

Balanced Equipment
means
Economical Production

IS your equipment balanced to give efficient and economical production and at the same time keep overhead to the minimum?

Very often by adding slightly more equipment or by making a few changes in the present equipment, it is possible to cut overhead and materially increase profits.

We have recently made surveys of a number of plants, planned and executed additions and changes for them with very pleasing results.

Our service is at your command.

Designing — Supervising — Consulting

ROBERT AND COMPANY
INCORPORATED
ARCHITECTS AND ENGINEERS
Atlanta, Ga.

"That Brick Was Laid in 1894—

We can't ask a better investment than that!"

THERE are numerous towns and cities in which the citizens can point with satisfaction to *brick-paved* streets laid way back in 1894 or earlier.

For instance, Springfield, Ill., has a brick pavement still in service which was laid in 1889—35 years ago. Lincoln, Nebr., uses a 34-year old veteran. Taxpayers in Clearfield, Pa., and Bucyrus, Ohio, profit by 33-year old brick pavements. Lynchburg, Va., points to 32-year old brick surfaces in good condition—so do Winona, Minn., and Clinton, Ia.

Tonawanda, N.Y., has several brick-paved streets with 31 years of faithful service to their credit—and so has Cleveland, O., though some of them were laid on the natural soil without any other base or support!

And among those using 30-year old pavements are Joliet, Danville, East St. Louis and Carlinville, Ill., Meridian, Miss., and Williamsport, Pa.,—to mention just a few out of a long list.

See to it that your community buys *today*—pavements that will still be in service in 1954.

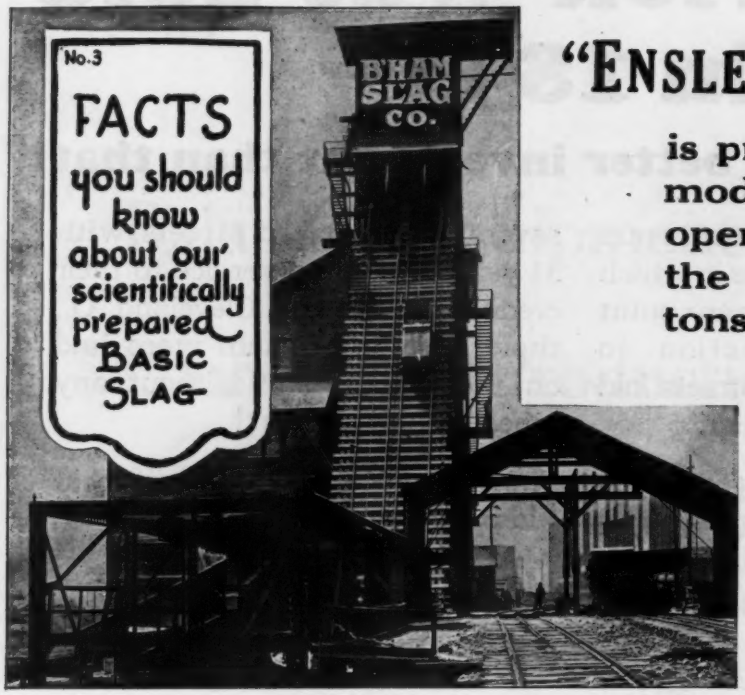
VITRIFIED **Brick** PAVEMENTS

Advocate vitrified brick *—the pavement that outlasts the bonds.*

OUTLAST THE BONDS

NATIONAL PAVING BRICK MANUFACTURERS ASSOCIATION, ENGINEERS BLDG., CLEVELAND, OHIO

Alton Brick Company, Alton, Ill.
Binghamton Brick Company, Binghamton, N. Y.
Cleveland Brick & Clay Company, Cleveland, Ohio
Clydesdale Brick & Stone Co., Pittsburgh, Pa.
Coffeyville Vitrified Brick & Tile Co., Coffeyville, Kans.
Collinwood Shale Brick Company, Cleveland, Ohio
Francis Vitric Brick Company, Boynton, Okla.
Georgia Vitrified Brick & Clay Co., Augusta, Ga.
Globe Brick Company, East Liverpool, Ohio
Hisylvania Coal Co., Columbus, Ohio
Hocking Valley Brick Company, Columbus, Ohio
Independence Paving Brick Co., Independence, Kans.
Metropolis Paving Brick Co., Pittsburg, Kans.
Metropolitan Paving Brick Co., Canton, Ohio
Mineral Wells Paving Brick Co., Mineral Wells, Texas
Moberly Paving Brick Company, Moberly, Mo.
Murphysboro Paving Brick Co., Murphysboro, Ill.
Nelsonville Brick Co., Nelsonville, Ohio
Peebles Paving Brick Company, Portsmouth, Ohio
Purington Paving Brick Company, Galesburg, Ill.
Southern Clay Mfg. Company, Chattanooga, Tenn.
Springfield Paving Brick Company, Springfield, Ill.
Sterling Brick Company, Olean, N. Y.
Streator Clay Mfg. Company, Streator, Ill.
Thurber Brick Company, Ft. Worth, Texas
Toronto Fire Clay Company, Toronto, Ohio
Trinidad Brick & Tile Company, Trinidad, Colo.
Veedersburg Paver Company, Veedersburg, Ind.
Western Shale Products Company, Fort Scott, Kans.
Westport Paving Brick Company, Baltimore, Md.



"ENSLEY BASIC SLAG"

is produced in this modern electrically operated plant at the rate of 4000 tons per day

STANDARD SIZES

Number	Use	Sizes
*1	For Roads	4" to 2½"
*12	" "	4" to 1½"
2	" "	2½" to 1"
23	For Concrete	2½" to ⅝"
3	" "	1½" to ⅝"
34	" "	1½" to ¼"
4	" "	¾" to ¼"
46	For Roads	¾" to 10 mesh
6	" "	⅝" to 10 mesh
*6-A	Washed Roofing	⅝" to ¼"
7	For Roads	¼" to dust

*These sizes produced at Ensley plant only.

—processes of crushing, screening and sizing to exact specifications

What becomes of the Slag after it leaves the modified pits?

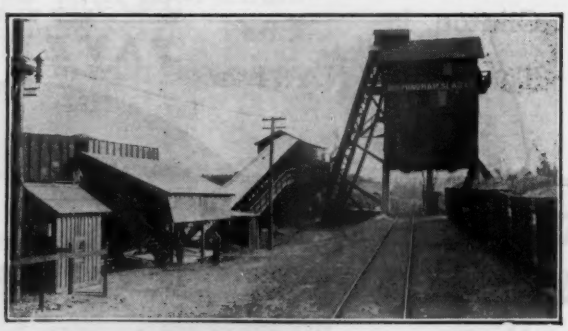
It is brought by electric locomotive trains to a modern electrically operated crushing plant.

Skip cars carry it from the two gyratory crushers up a steep incline to the top of the screening plant and automatically dump it into a big bin.

The crushed Slag then passes over two magnetic rolls, for removal of small pieces of free iron, and into two revolving screens 26 ft. long and 5 ft. in diameter.

The ¾ inch to dust material is first removed from the crusher run slag and passes down chutes to four electric vibrating screens where it is separated into four sizes—Nos. 4, 5, 6 and 7.

After the ¾ inch material has been removed the coarser slag is separated in the big revolving screens into six sizes—Nos. 1, 12, 2, 23, 3, 34. All slag over four inches is returned to the rebreaker crusher by gravity chute.



Plant No. 2 at Alabama City, Ala.: electrically operated throughout; daily capacity 2000 tons of "Alabama City Basic Slag"

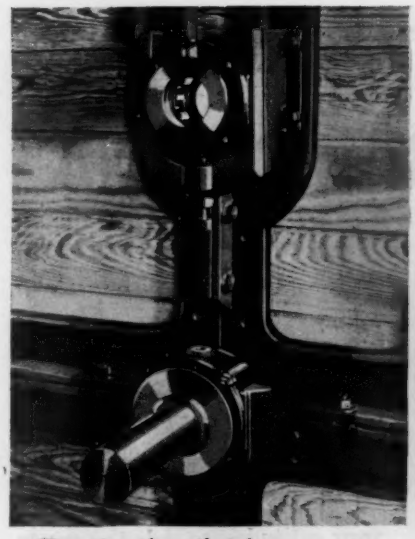
The sizing completed, the Slag drops into concrete storage bins from which it is loaded into cars directly underneath and weighed on railroad track scales.

All weights are certified by the Southern Weighing & Inspection Bureau and delivered by our own locomotives to the ten trunk line railroads serving the Southeast. This method saves from two to five days in the handling of every shipment and assures uninterrupted, prompt service—a factor of first importance to every user of "coarse aggregate" and "road metal."

Birmingham Slag Co.

Slag Headquarters for the South

ATLANTA **BIRMINGHAM** THOMASVILLE



Showing the oil-tight construction of the Hyatt bearing housing on a washer manufactured by The Rodney Hunt Machine Company.

A battery of 12 Hyatt equipped washers made by The Rodney Hunt Machine Company, Orange, Mass. for a large New England mill.

Cleaner and More Economical Finishing Machinery Operation

USERS of finishing machinery equipped with Hyatt roller bearings find that spoilage of goods by leaking oil is eliminated.

Their operating costs are cut through the reduced power consumption and lubrication savings that are effected by the Hyatt bearings.

In Hyatt equipped machinery, bearing adjustments are entirely done away with. Bearing replacements are reduced to a minimum, insuring practically continuous and dependable operation with no attention other than lubrication at infrequent intervals. The exceptional durability of Hyatt bearings make them particularly adaptable to heavy finishing machinery.

The Rodney Hunt Machine Company equip their washers, fulling mills and reel machines with Hyatt bearings when specified and recommend Hyatt equipped machines to their customers.

However, it is not necessary to buy new machines in order to secure the advantages of these bearings. When buying new rolls, you can have Hyatt bearings applied and get many years of better service. On new machines, these advantages are secured by simply specifying Hyatt roller bearings.

A new 50 page illustrated bulletin covering the application of Hyatt bearings to many classes of textile machinery is now ready for distribution. Write for a copy.

HYATT ROLLER BEARING COMPANY

NEWARK DETROIT CHICAGO SAN FRANCISCO
HUNTINGTON PHILADELPHIA PITTSBURGH MINNEAPOLIS
WORCESTER CLEVELAND MILWAUKEE

Are You Different from Other Men?

A Simple Test that will Aid You to Select with Certainty the Main Road to Advertising Success

By Jesse H. Neal

YOU are now reading a "Business Paper," one that specializes in the problems of sales management—it is YOUR paper—dealing altogether with your problems in both text and advertising. It is made for you, and it is to your credit that you entertain for it an unusual degree of interest.

But have you stopped to reflect that you are not different in this respect from other men? Men in other fields have the same interest in their work that you have in yours. They must have timely, dependable information about equipment, materials, processes, prices and markets. They get all this in THEIR business paper—to these men it is more than a publication—it is an essential working tool.

Check up your own plant, and you will find that each important executive reads a business paper—his business paper. And his interest in the paper is in precise proportion to his interest in his job or the business.

Results of One Check-Up

Then check up the people to whom you SELL and you will find the same situation. A nationally known firm of public accountants checked up the buying habits of the executives in 609 leading manufacturing concerns, and found that OVER NINETY-FIVE PER CENT specified business papers as their principal source of buying information.

Answering a direct question, these executives advised other concerns with anything to sell to them to advertise in the proper business papers.

If you sell to retail merchants, the same principle holds good. To a progressive merchant, his retail business paper is more necessary, if possible, than the industrial paper to the manufacturer. The surest, quickest, cheapest way to get dealer cooperation through advertising, is to use the dealers' own papers.

Now go on into the professional field—the engineers, the architects, the teachers, the doctors, etc., and here you find their technical periodicals regarded as a continuous post graduate course—practically their only means of keeping up with the constant growth and change going on in their professions—as necessary as text books in a college.

Significance to Sales Executives

What should all this mean to the alert sales manager? That this is an age of specialization in publishing as well as in business—that the specialized advertising message in a specialized medium, going to a specialized group, is, in the nature of things, the most effective and economical sales auxiliary known to present day practice.

No, you are not different from other men in the interest you feel for your own problems, nor in your attitude towards the paper dealing exclusively with those problems.

But you ARE in the minority, if you are not using business papers in an adequate, representative way, and at a disadvantage, too, as compared with those who are. Last year 170,000 advertisers placed 800,000 to 1,000,000 pages of advertising in the trade, technical and industrial papers of the country—the "business" papers.

One point more—there is the same difference between publications as there is between flesh and blood salesmen. Some salesmen are better than others. The trade-mark in the publishing field that indicates the top notch of publishing excellence is—"Member of the Associated Business Papers, Inc."

If you want our cooperation in helping you get market FACTS, or in picking the right business papers for your purpose, just ask for it. Our Advisory Service Bureau has nothing to do with the sale of space—it deals only with counsel and its services are free of any charge or obligation.

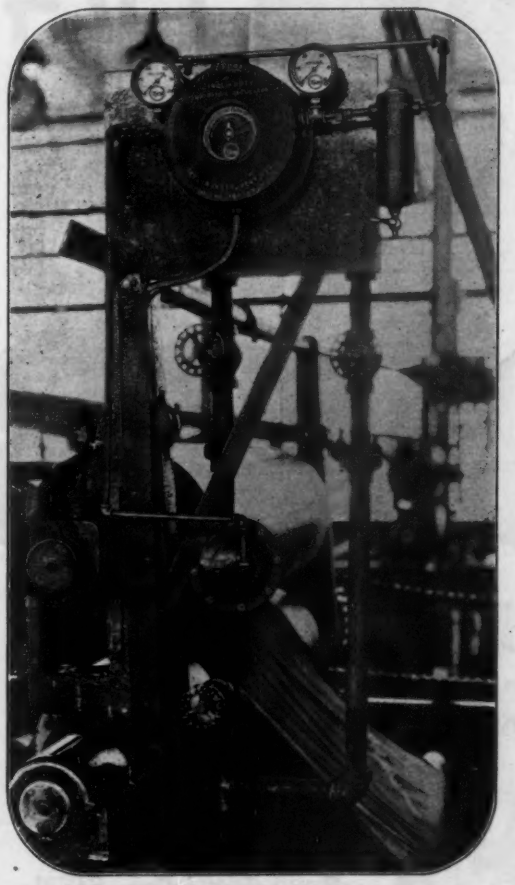
THE ASSOCIATED BUSINESS PAPERS, INC.

Composed of qualified papers only, reaching 54 distinct fields of trade and industry

Headquarters, 220 West 42nd Street - New York

Tycos Temperature Instruments

INDICATING · RECORDING · CONTROLLING



Gregg Uses *Tycos* For Continuous Sulphur Dyeing

THE photograph shows one of the installations of a *Tycos* Singl-Duty Temperature Regulator on the continuous sulphur khaki dye vats in the Gregg Dyeing Company's Plant at Graniteville, S. C. This *Tycos* Control insures them of a level shade at all times.

Tycos Regulators are recommended for applications where correct temperatures and steam conservation are wanted.

Tycos Controls for size cooking produce uniformity.

Insure penetration and uniform coating by installing *Tycos* Regulators to control the temperature and level on the size box.

Use *Tycos* Regulators to obtain properly sized and dried cotton warp yarn from slashers.

Tycos Controls insure correct drying which means less shedding and fewer broken ends in the weaving.

A new catalog just off the press. Valuable information that will lead to economy through temperature control. Ask for a copy of Part 3 Textile Catalog.

Taylor Instrument Companies

ROCHESTER, N. Y., U. S. A.
Canadian Plant
Tycos Building, 110 Church St., Toronto

Tycos Temperature Instruments

INDICATING · RECORDING · CONTROLLING

There's a Tycos or Taylor Temperature Instrument for Every Purpose

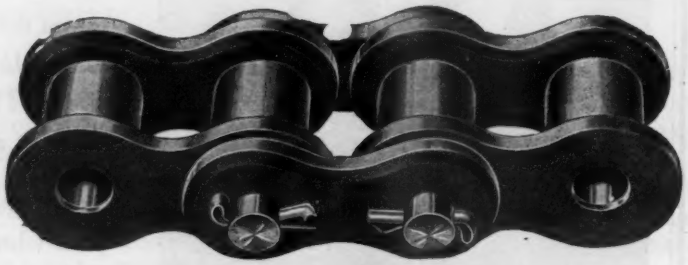
A Business Established On Quality and Service

1896 GENUINE BALDWIN CHAINS 1924

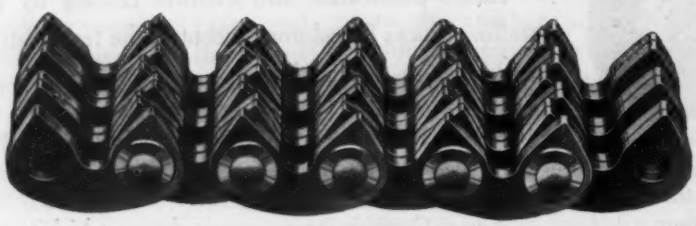
Is a Permanent Institution

For more than 27 years Baldwin has built quality, strength and service into steel roller chains—in fact, the history of **Baldwin** is the history of the Roller Chain Industry.

Accuracy (within thousandths of an inch—Pins and Bushings ground to exact size) result in **LONGER LIFE.**



As one satisfied customer recently expressed himself, after his set of chains and sprockets had been in use more than 8 months (running continuously day and night) under one of the most severe conditions to be found anywhere—**"If they are worn anywhere we cannot find it—"**



Simplicity of Design
Extreme Accuracy
Superior Alloy Steels
are combined in

Baldwin Quiet-Running High Speed Chains

Only two parts—Links of special alloy steel heat treated, pins of special alloy steel case hardened, tempered, and afterward ground to exact size. The ideal motor-to-machine or motor-to-lineshaft drive.

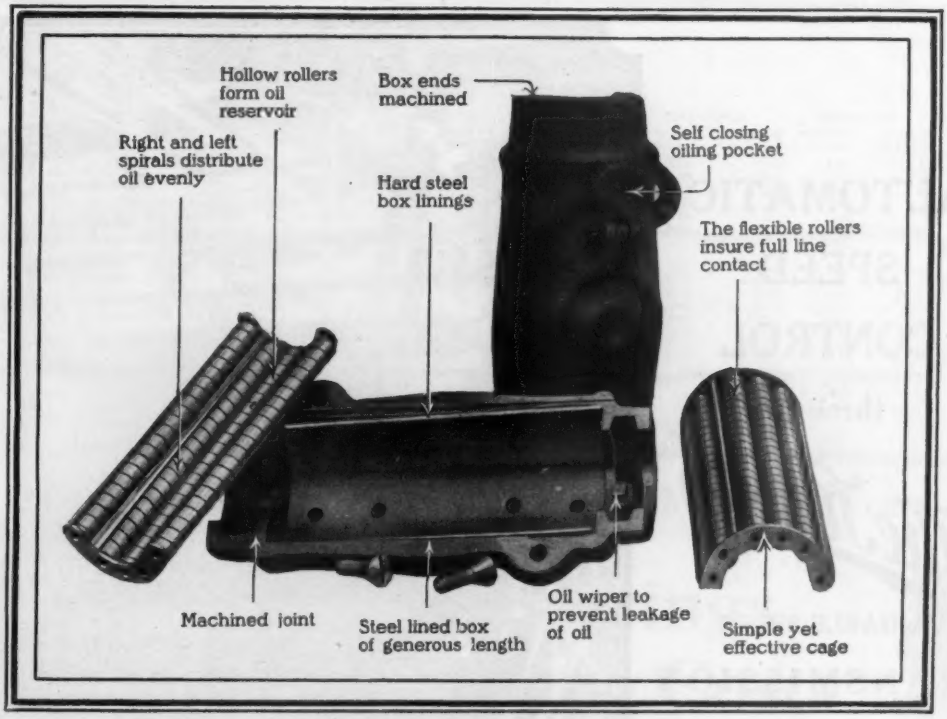
Ask the Baldwin Sales Engineer to discuss your problem with you.

See Baldwin exhibit at
Southern Textile Exposition
Greenville, S. C., Oct. 20th to 25th inclusive.

Baldwin Chain & Mfg. Co.

WORCESTER, MASS.

ATLANTA OFFICE—404 McGLAWN-BOWEN BLDG. CHICAGO OFFICE—PEOPLES GAS BLDG.


Hollow rollers form oil reservoir
Box ends machined
Right and left spirals distribute oil evenly
Self closing oiling pocket
Hard steel box linings
The flexible rollers insure full line contact
Machined joint
Steel lined box of generous length
Oil wiper to prevent leakage of oil
Simple yet effective cage

Hyatt line shaft bearings are split, permitting quick installation without disturbing belts, pulleys, clutches or couplings.

The Value

Of Eliminating Plain Bearing Friction In Your Line Shafting

IT is only good business sense to do away with wasteful plain bearing friction in your line shafting.

By equipping your plant with Hyatt roller bearings you can literally give new life to your power transmission system. The resulting economies in power, lubrication and maintenance pay the cost of the bearings in one to two years, and yield a very attractive return on the investment for many years thereafter.

Hyatt engineering bulletin No. 130 fully describes these bearings and their advantages, besides furnishing information of value on power transmission. *Write for a copy.*

'Phone the Nearest Mill Supply Dealer

HYATT ROLLER BEARING COMPANY
NEWARK, NEW JERSEY
PACIFIC COAST ADDRESS: SAN FRANCISCO, CAL.

HYATT ROLLER BEARINGS FOR LINE SHAFTING

AUTOMATIC SPEED CONTROL

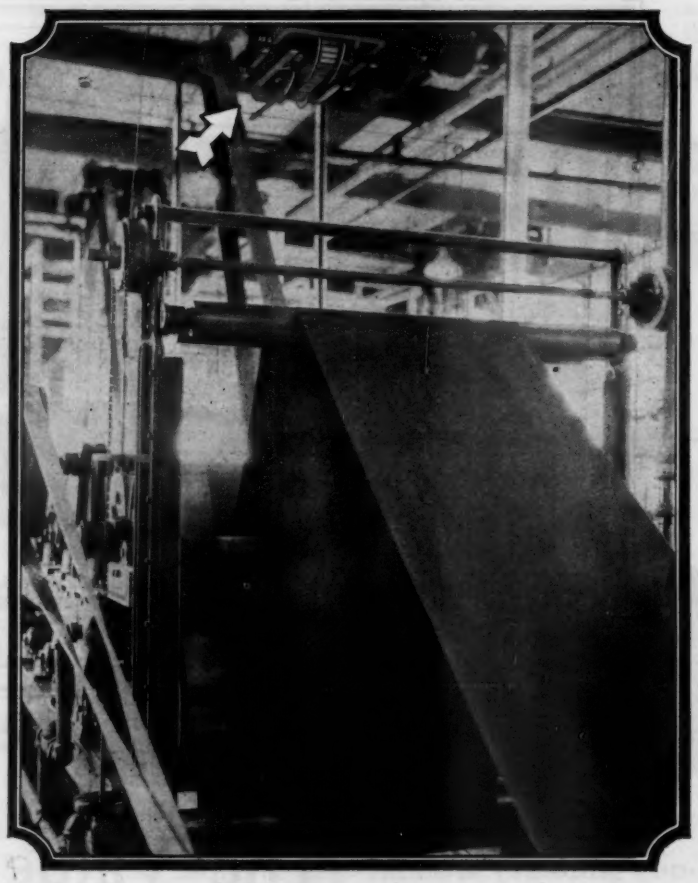
through

"The Reeves"

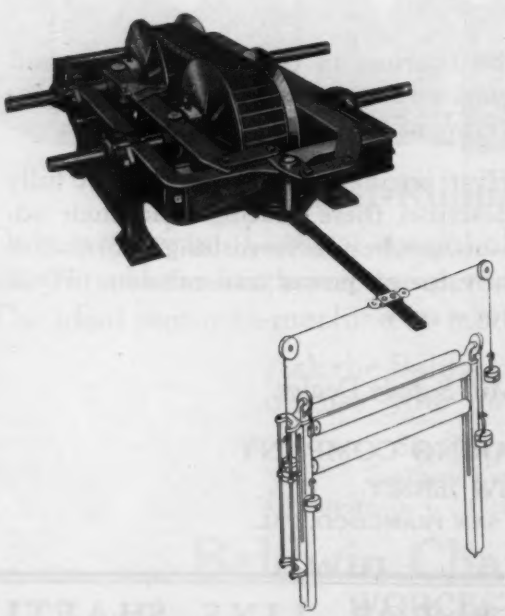
VARIABLE SPEED

TRANSMISSION

Extremely simple, sensitive and reliable. Very inexpensive—easily and quickly installed. No electrical apparatus nor complicated switches to get out of order. Will operate without a moment's attention or a penny's expense after once installed. Absolutely fool-proof.



REEVES Automatic Control on finishing range, Gregg Dyeing Company, Graniteville, S. C.



The installation of "THE REEVES" Automatic Control on the dyeing and finishing range in the new plant of the Gregg Dyeing Company, represents a wonderful and unique advancement in the method of finishing cloth.

"THE REEVES" Automatic Control is ABSOLUTELY AUTOMATIC in that when once connected it never has to be touched or watched—never gets out of adjustment or balance—never fails to operate,—always keeps the tension of the cloth uniform. So poistive in its automatic regulation that there is absolutely no "hunting" whatever of the floating roll—it moves to its proper position and there it stops.

When the speed of the "master" or hand controlled machine in the range is varied, all other machines automatically vary with it and simultaneously hold the tension of the fabric uniform.

We will have a running display at the Greenville Exposition. See us at our space No. 225.

REEVES PULLEY CO.

COLUMBUS, INDIANA

192 COTTON

Some Statistics in Tabular Form.

	1893—1903		1904—1908		1909—1913		1914—1918		1919—1923	
	Five Yr. Additions	Accumulative Totals	Five Yr. Additions	Accumulative Totals	Five Yr. Additions	Accumulative Totals	Five Yr. Additions	Accumulative Totals	Five Yr. Additions	Accumulative Totals
Adding Machines	40	40	62	102	200	302	335	637	485	1,122
Calculating Machines	.....	.....	8	8	52	60	245	305	472	777
Acetylene Welding Equipment	.....	.....	5	5	45	50	200	250	215	465
Electric Welding Equipment	.....	.....	.....	.....	.....	.....	2	2	30	32
Inter-Plant Electric Trucks	.....	.....	.....	.....	.....	.....	10	10	25	35
Temperature Regulators	.....	.....	17	17	75	92	267	359	645	[illegible]
[illegible]	.....	.....	.....	.....	30	30	117	[illegible]	485	[illegible]
BALL BEARINGS—										
On Shaft Hangers	.....	.....	10	10	172	182	2,042	2,224	8,762	10,986
On Picker Beaters	.....	.....	60	60	95	155	3,885	4,040	13,680	17,720
On Picker Aprons	.....	.....	.....	.....	.....	.....	655	655	10,208	10,763
On Picker Eveners	.....	.....	.....	.....	.....	.....	150	150	5,925	6,075
On Slasher Cylinders	.....	.....	.....	.....	115	115	265	380	480	860
On Card Cylinders	.....	.....	.....	.....	.....	.....	130	130	1,484	1,614
On Warper Measuring Rolls	.....	.....	.....	.....	170	170	220	390	2,805	3,195
Elsewhere	.....	.....	.....	.....	.....	.....	1,287	1,287	22,555	23,842
[illegible]	.....	.....	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Main Drives (Number)	.....	.....	.....	.....	17	17	2,757	2,774	12,952	14,726
Plant Telephone Systems	2	2	10	12	25	37	67	104	95	199
Pick Counters (Number)	.....	.....	2	2	12	14	1,142	1,156	15,762	16,918
Other Counters (Number)	940	940	1060	2000	2,407	4,407	4,820	9,227	7,722	16,949
Cloth Testers	12	12	27	39	40	79	85	164	105	269
Yarn Testers	[illegible]	[illegible]	57	127	113	240	107	306	190	496

10,000% Increase in Use of Ball Bearings in Mills in 10 Years

Strom Ball Bearings Reduce Operating Costs

Double-acting thrust bearing, flat seats (grooved races) 2100-F Series

Single-acting thrust bearing, flat seats (grooved races) 1100-F Series

Single-acting, self-aligning thrust bearing 1100 Series

Single-acting, self-aligning thrust bearing, leveling washer, 1100-U Series

Double-acting, self-aligning thrust bearing, leveling washers 2100-U Series

IN 1913 there were less than 700 ball bearings in use on cotton mill equipment.

In 1923, ten years later, there were more than 75,000 ball bearings in service—approximately 10,000% increase.

Ball bearings are now used on shaft hangers, picker beaters, picker aprons, picker eveners, slasher cylinders, card cylinders, on warper measuring rolls, and for many other purposes.

They are economical

In every case they have proved their ability to reduce operating costs, save power, increase and improve production, save lubricating costs and time losses.

The most progressive modern mills have adopted Strom Ball Bearings. They *know* that they are money savers.

In lubrication alone they have saved more than 90% of the cost. Results are a uniform product, a perfect lap, higher speed, and a vast saving of time losses necessitated by setting back imperfect laps.

Lubricating only two or three times a year, as against daily greasing, is another big economy. And ball bearing equipped rollers are clean. No oil leakage to run down on the lap rod and stain the product.

Correctly made ball bearings necessary

Strom Ball Bearings enjoy a nation-wide reputation for quality, durability and high precision.

They are made of the best special alloy steel, hardened throughout to insure uniform hardness, elasticity and durability. They last for years.

Get all the facts

For further information, on textile applications, write the Aldrich Machine Works, Greenwood, S.C.

Single-row deep-groove Standard type, radial bearing

Double-row, deep-groove Standard type, radial bearing

Angular contact bearing, combination radial and thrust

Double-row, maximum type, radial bearing

Single-row, maximum type, radial bearing

Strom BALL BEARINGS

STROM BALL BEARING MFG. CO.

Formerly U. S. Ball Bearing Mfg. Co.

4544 Palmer Street, Chicago, Ill.

THE JOHNSON FRICTION CLUTCH

—"Perfect Clutch Satisfaction"— Writes McCallum Hosiery Co.

Single Clutch with Pulley

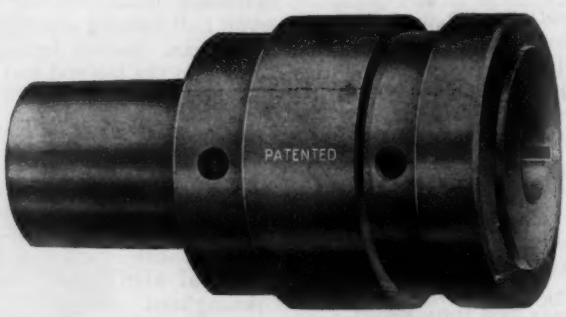
The McCallum Hosiery Company, of Northampton, Mass., writes us as follows:

. . . *"We find your clutches are giving perfect satisfaction under very severe conditions, and we can recommend with pleasure their use to any of your clients or to prospective purchasers."*

Very truly yours,
McCALLUM HOSIERY COMPANY.

DOUBLE CLUTCH EXTERIOR

How's that for an absolutely unsolicited testimonial from a satisfied user of Johnson Clutches? This written and signed testimony comes from a well known New England textile machinery builder in Northampton, Mass. Many more of America's leading builders of textile machinery, such as H. W. Butterworth & Sons Co., and others, can testify that Johnson Clutches give high grade service on textile machines for years and years.

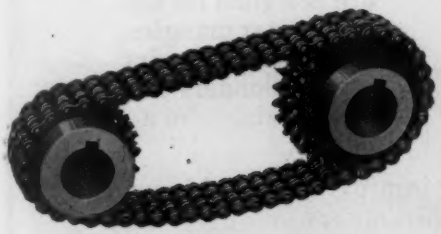


SINGLE CLUTCH EXTERIOR

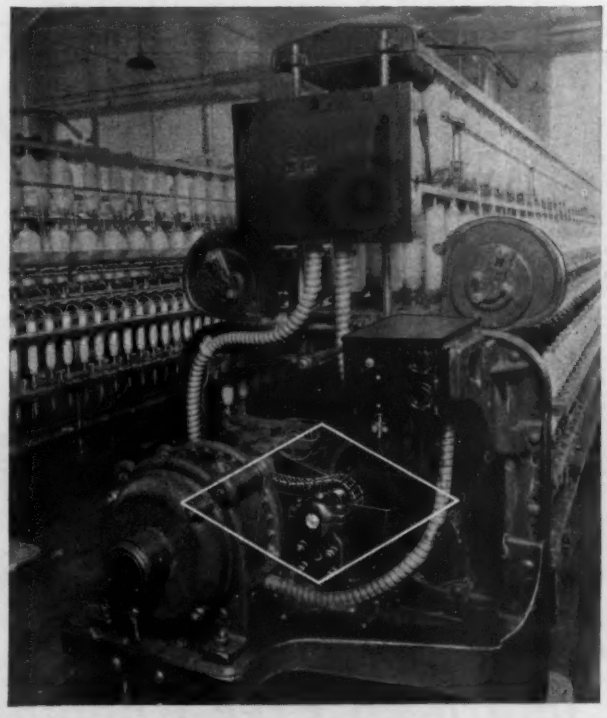
The Johnson is a small, compact, powerful clutch. It is being used with fine success all over the country on dyeing jiggers, tentering machines, cards, looms, cutting and sewing machines, silk washing and dyeing machines, etc. It will help YOUR machine wonderfully. Instant stopping and starting; perfect control. Equip your machines with Johnson Clutches. Get our complete free clutch data.

Write for Catalog "G."

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.



DIAMOND Roller Chain (No. 66 triple) used for driving spinning frames in large mill in New England. Drive transmits 7½ H.P. at 1740 R.P.M. Center distance, 8⅝ inches.



High Speed Roller Chains

for MOTOR DRIVES on SPINNING FRAMES

WITH the increasing use of individual motor drives on spinning frames and other textile machines, DIAMOND High Speed Roller Chains offer decided advantages over belts.

Roller chain drives are positive and smooth in action—no slipping, stretching or jerking. This means increased and improved production. They permit remarkably short centers, making compact drives and saving space. Power delivery is consistently efficient—98 to 99%. Little attention, other than lubrication, is required. Breakdowns and delays are averted, as roller chains have great strength and flexibility. They are quiet and clean—do not collect fly or dirt.

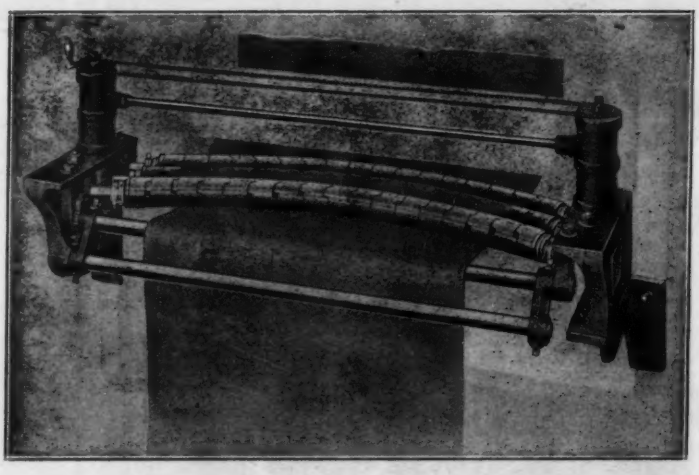
These superior features, plus low first cost and long life, are sufficient reasons for equipping your spinning frames with DIAMOND Roller Chain Drives.

Our engineers will be glad to go over your power transmission requirements and point out just how roller chains will improve the conditions in your mill.

DIAMOND CHAIN & MFG. CO. Indianapolis, U.S.A.

Makers of High Grade TRADE MARK *Chains Since 1890*

DIAMOND Roller Chains



The MYCOCK *Regulating* Cloth Expanders

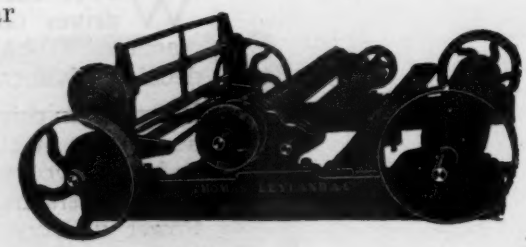
are designed for use with water mangles, starch mangles, dry cans, calenders and mercerizing machines.

The three bar type as illustrated represents the latest improvement in this type of machine and shows the regulating motion and adjustable tension bars. Our experts spared no effort in making this machine the last word in efficient and durable construction.

Improved Free-Running Scutchers

Designed for use in bleacheries, calico print works, piece dye works, woolen and worsted mills this Improved Free Running Scutcher meets the most exacting demands of the textile industry.

With its universal bearings and our new idea patented scroll rolls, gear driven (belt driven if desired) it is easily the best scutcher on the market.



Scutcher is furnished with Single and Double Beaters, Single or Double Rollers as desired. All working parts are interchangeable, therefore easily replaced.

Open your cloth by machine and not by hand.

Write for complete details.

WE WILL WELCOME YOU AT SPACE 24, 25, 26 AT THE SOUTHERN TEXTILE EXPOSITION OCTOBER 20th TO OCTOBER 25th

THOMAS LEYLAND & CO., INC.

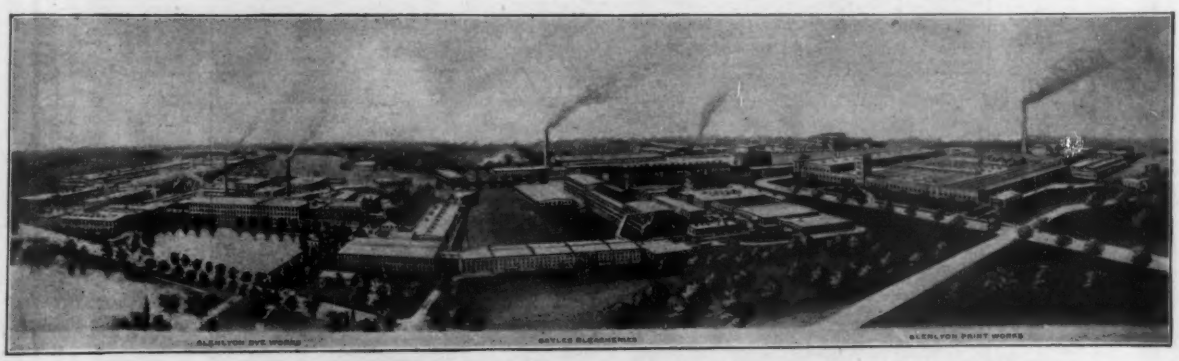
F. T. WALSH, Vice-Pres. and Gen'l Mgr.

SOLE MANUFACTURERS
Also Manufacturers of Gums and Dextrines
Office and Works:

READVILLE STATION, BOSTON, 37, MASS.

SAYLES FINISHING PLANTS, INC.

Sayles Bleacheries	Saylesville, R. I.	Plant A
Glenlyon Dye Works	Saylesville, R. I.	Plant B
Glenlyon Print Works	Phillipsdale, R. I.	Plant C
Glenlyon Yarn Dye Works	Phillipsdale, R. I.	Plant E
New York Office	72 Leonard St.,	New York City



SAYLES BLEACHERIES

Bleachers and Finishers of Cotton Fabrics in All Weights and Widths. Artificial Silk and Colored Yarn Novelties Treated to Bring Out Best Effects.
Permanent Finish Applied on Large Variety of Fabrics.

GLENLYON DYE WORKS

Mercerizers, Dyers and Finishers of Cotton Piece Goods. Colors Fast to Light and Washing a Specialty.
Flock Printing done by the "Glenlyon Process."
Beaded Printing done by the "Sayles Process."

GLENLYON PRINT WORKS

Bleachers, Dyers and Printers of Fine Cotton Goods and Fabrics of Silk and Cotton.
Special department for handling of Crepe Fabrics with Artificial, Celanese, or Real Silk, in order to produce the latest effects in dyeing and printing.

GLENLYON YARN DYE WORKS

Bleachers and Dyers of Cotton Yarn in Ball Warps and Skeins, Artificial and Natural Silk Yarns. Colors Fast to Bleaching a Specialty. Beamers, Warpers, Quillers and Winders.

FOR GENERAL INFORMATION ADDRESS:

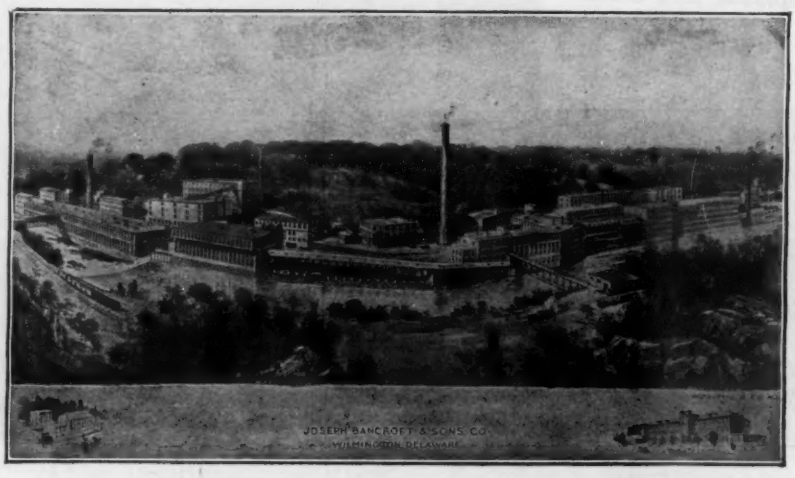
SAYLES FINISHING PLANTS, INC.

Saylesville, R. I.

JOSEPH BANCROFT
1831

JOSEPH BANCROFT & SONS
1865

JOSEPH BANCROFT & SONS CO.
1899



JOHN BANCROFT, President
JOSEPH BANCROFT, Vice President
JOHN MACADAM, Vice President

R. O. COOKE, Treasurer
JOHN B. BIRD, Secretary
J. H. COADY, Purchasing Agent

Joseph Bancroft & Sons Co.

Bleachers, Mercerizers, Dyers and Finishers Cotton Piece Goods

Wilmington, Delaware

JOHN BANCROFT, JR.,
Sales Mgr.

New York Office,
320 BROADWAY

The Hallmark of Quality

Color Expression

befitting the finest fabrics.

IN the wise determination of Color or Finishing treatment consistent with market demand, the resources of the U. P. D. W. organization represent a range of specialized effort extending from the origin of a theory to its practical execution.

Upon such an assembly of talent and facility rests our major appeal to the Textile Producer.

United Piece Dye Works

DYERS, PRINTERS, FINISHERS OF TEXTILE FABRICS IN THE PIECE

SKEIN DYEING

LODI . . NEW JERSEY

New York Office: 132 MADISON AVENUE

Mills: LODI AND HAWTHORNE, N. J.

Weidmann Divisions: PATERSON, N. J. AND ALLENTOWN, PA.

At The SOUTHERN FRANKLIN PROCESS COMPANY BOOTH —

ASK the representative in charge about the manufacturing economies made possible by the Franklin Process, — the elimination of beaming and the cutting of handling charges.

It would give us great pleasure if you would make our booth your headquarters during the convention. You will find a cordial welcome.

FRANKLIN

Dyes Yarn in Wound Form Under Pressure

See How the FRANKLIN PROCESS Can Be Used in Your Business

DON'T fail to seek out the Franklin Process Company's booth at the Greenville Convention. You will see how many manufacturers are using the Franklin Process job dyeing facilities to help them produce better fabrics.

We wish especially to call your attention to the possibilities of guaranteeing bleaching-fast dyes when applied by the Franklin Process. In the center of the exhibit there is a sample Franklin Process dyeing machine to demonstrate how yarn is dyed in the wound form under pressure. Unusual penetration is secured, as well as solid, even, and brilliant colors.

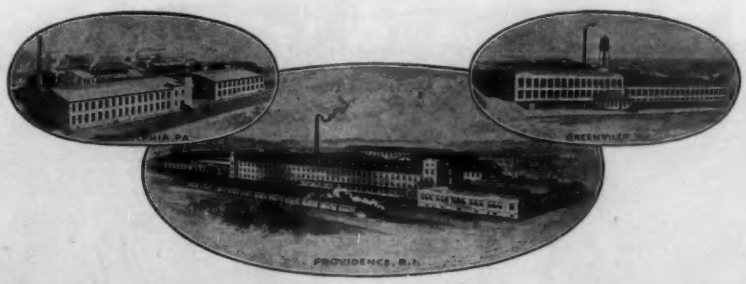
FRANKLIN PROCESS COMPANY

Largest Job Dyers of Yarn in America
also Yarn Spinners, Manufacturers' Glazed Yarns, Dyeing Machines

Philadelphia PROVIDENCE Denton, Eng.

New York Office, 66 Leonard St.

SOUTHERN FRANKLIN PROCESS COMPANY
Greenville, S. C.



FRANKLIN·PROCESS COMPANY

We apply All Classes of Color to—

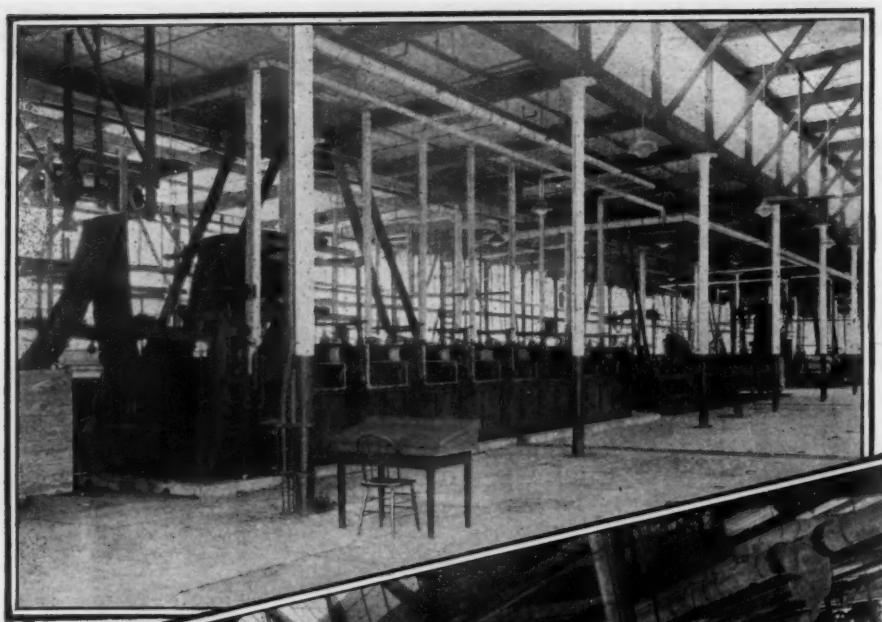
Cotton Yarns
For
Shirtings
Dress Goods
Handkerchiefs
Satines
Curtain Cloths
Artificial Silk Draperies (as warp)
Wire Trade (as insulating)
Tire Fabrics
Fire Hose
Blankets
Mattresses
Denims
Umbrella Cloth
Stripings and Selvages in Worsted Cloth
Whips
Woven Labels
Novelties
Thread
Cord
Fishing Line
Rope
Towels
Terry Cloth
Bedspreads
Plushes
Velvets
Roving
Cable Cords
Bags
Automobile Cloths
Hosiery (including fine splicing yarns and yarns for ingrain colors)
Narrow Fabrics (corsage strings, shoestrings, tape, braid)

Worsted Yarns
For
Men's Suitings
Hosiery
Ladies' Dress Goods
Including fine singles that cannot be dyed by any other process.

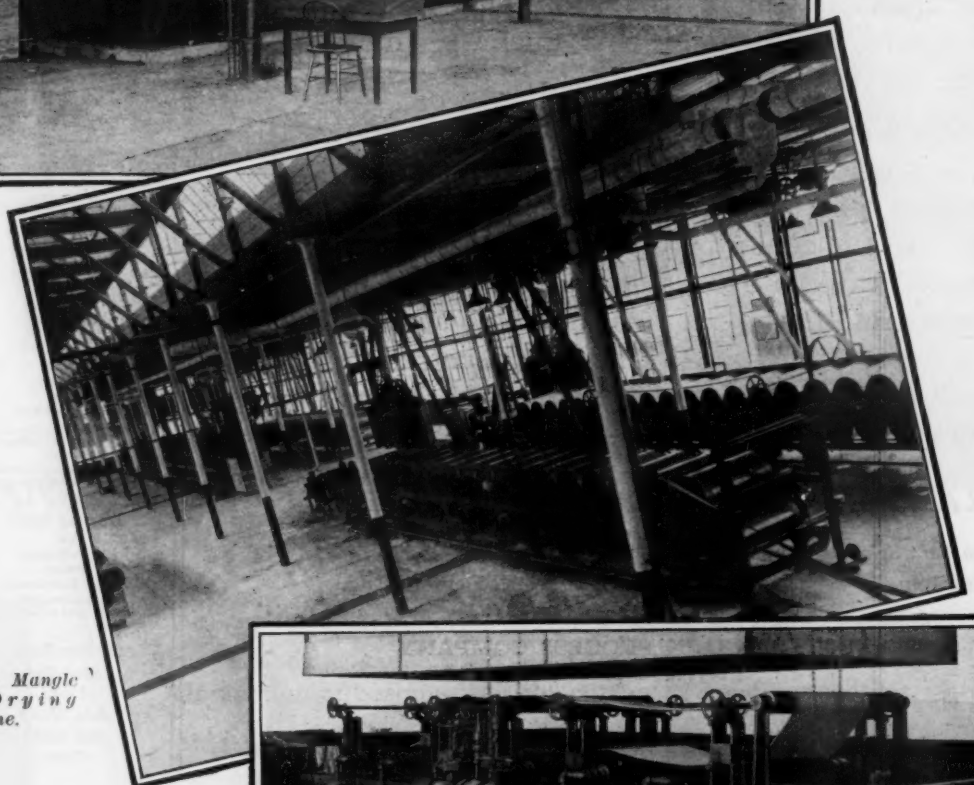
Merino Yarns
Spun Silk Yarns
Jute, Hemp and Linen Yarns

TO·HARNESS·THE·FASHION·FOR·THE·SERVICE·OF·MANKIND

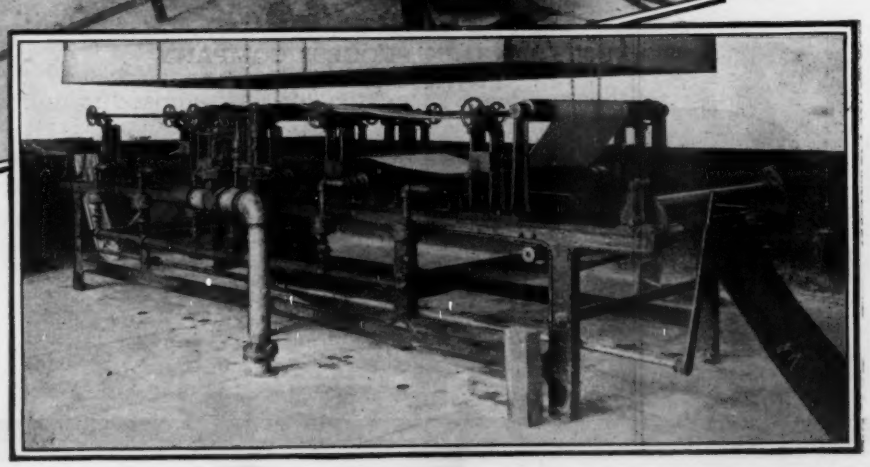
PROCESS



All in Range Dye Padding Machine, Skying Machine, Washing and After Treating Machine and Dyeing Machine.



Starch Mangle and Drying Machine.



Singeing Machine.

BUTTERWORTH

Butterworth Finishing Machinery Is Used Exclusively in the Gregg Dyeing Plant

UP from the gray room—cloth rushes through a slot in the wall across the Singe, through the Diastafor, Jay Boxes, Scouring and Drying Machines, into the Padding Machine, over the Sky Frames, into the Washing and After-Treating Machines, to Dry Cans and then Trucks—there comes a breathing space while the load is moved across the floor. Again it starts—through the Starch Mangle, over 40 Dry Cylinders, to the Twilling Machine, overhead to the Steam Boxes, then it flashes through the Tentering Frame, Foxwell Guiders keep it straight as it enters—Finally it reaches the Simpson Automatic Cut-Off Winder and from there to the Finishing Room where the ribbon of cloth, forty thousand yards or so in length, is again made into cuts of finest Sulphur Khaki.

* * * * * * * * * * * * *

That Butterworth Machines in Range are used exclusively in preparing and dyeing the production of Gregg Plant makes us proud that we have built machines of which it is said, "they will never wear out."

H. W. BUTTERWORTH & SONS CO.

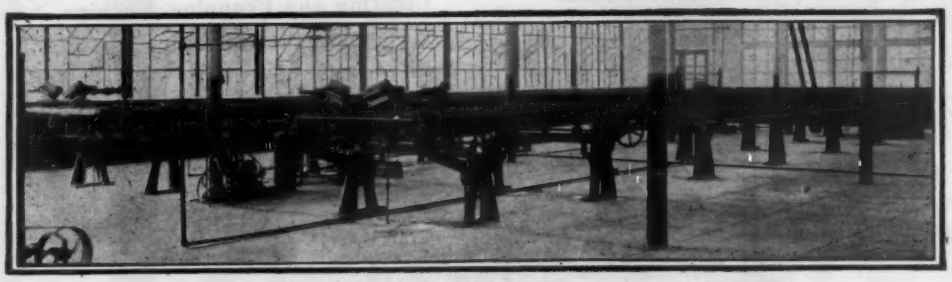
Established 1820

PHILADELPHIA, PA.

Providence Office: Turks Head Building

Canadian Representative: Hamilton, Ontario, Canada W. J. Westaway Company

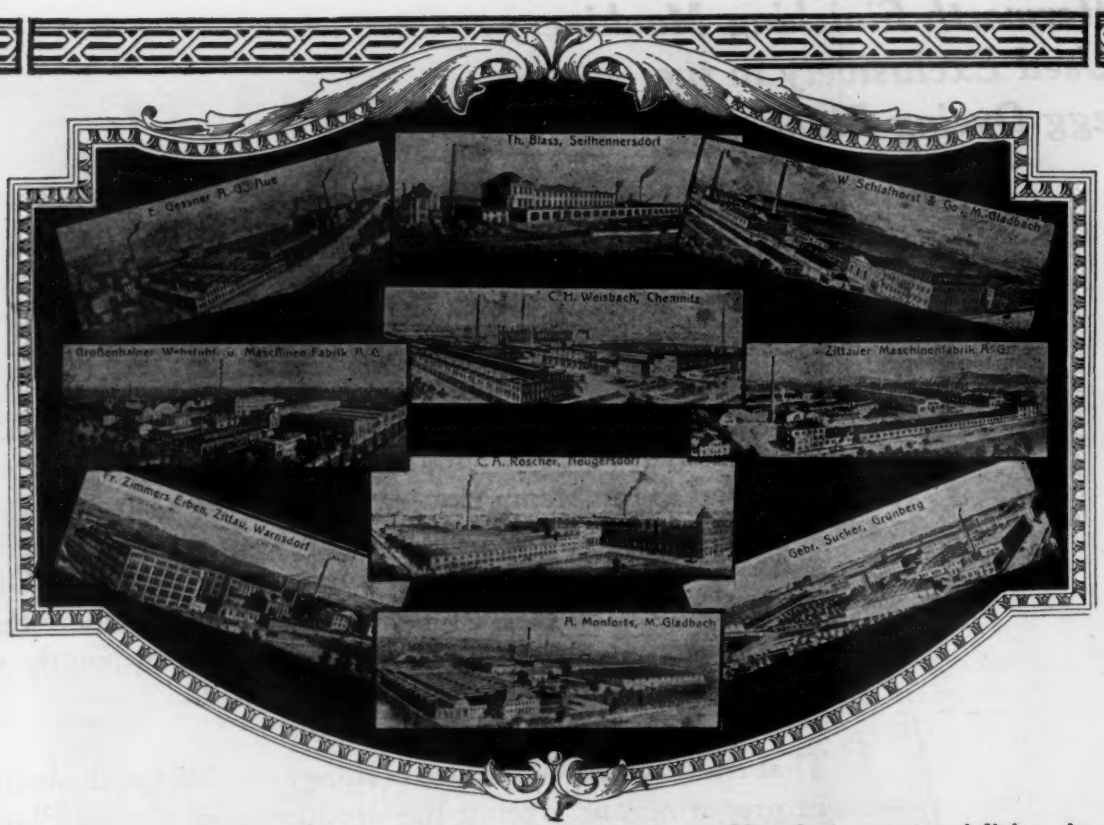
Southern Office: Greenville, S. C.



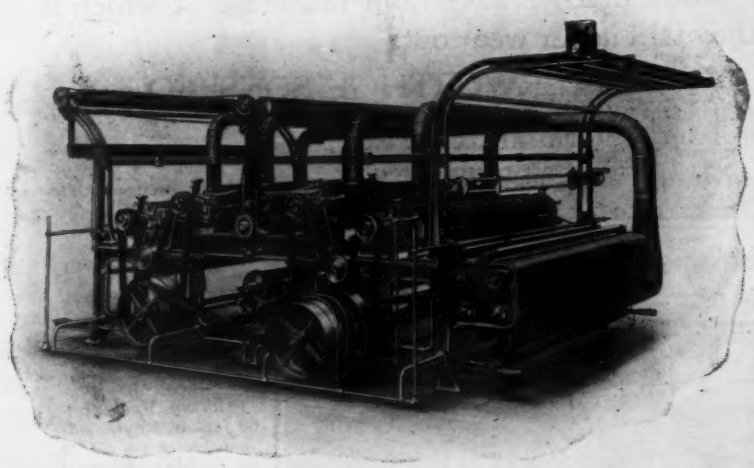
Tentering Machine—60 feet in length, adjustable from 20 to 50 inches. Foxwell Guiders and Simpson cut off Winder.

Finishing MACHINERY

UNIONMATEX


Th. Blass, Seifhennersdorf
E. Gessner A.-G. Plue
W. Schlafhorst & Co., M.-Gladbach
C. H. Weisbach, Chemnitz
Großenhainer Webstuhl- u. Maschinen Fabrik A. G.
Zittauer Maschinenfabrik A.-G.
C. A. Roscher, Reugersdorf
Fr. Zimmers Erben, Zittau, Warnsdorf
Gebr. Sucker, Grünberg
R. Monforts, M.-Gladbach

UNIONMATEX



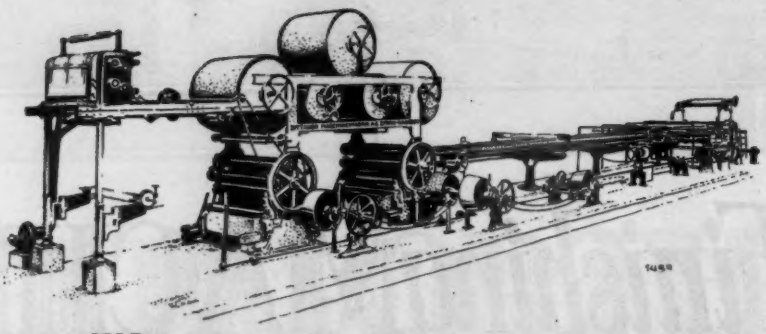
Manufacturers specializing in machinery and complete outfits for spinning, winding, warping, slashing, weaving, bleaching, mercerizing, dyeing, printing and finishing of all kinds of textile fabrics.

"Monforts"

No. 24/Z Pattern

Clearing and Cropping Machine, for cleaning the cloth on both sides, **with 4 sets of cutters** (2 sets for either side of the cloth) and with closed preliminary clearing box.

LET US SEND YOU FULL DATA AND ASSIST YOU IN WORKING OUT YOUR VARIOUS PROBLEMS.



"ZITTAU" MERCERIZING RANGE
LEVER OR HYDRAULIC PADDERS
WITH OR WITHOUT
LYE RECUPERATOR
WITH OR WITHOUT
NEUTRALIZING MACHINE

DAVID GESSNER SOLE AMERICAN AGENT FOR UNIONMATEX **41 Fremont St., Worcester, Mass.**

TESTED!

FLETCHER ELECTRIC UNDERDRIVEN EXTRACTORS have proven by the test of actual experience that they combine the essential requirements for

DURABILITY ECONOMY SAFETY
SIMPLICITY EASE OF CONTROL ACCESSIBILITY
CLEANLINESS

Wherever installed FLETCHER EXTRACTORS have done more and better work at a decidedly lower cost for operation and maintenance than any others previously used.

If you will tell us your extractor needs, we can prove to you the greater efficiency and greater economy of FLETCHER EXTRACTORS in present service.

FLETCHER WORKS

INCORPORATED
Formerly SCHAUM & UHLINGER
Glenwood Avenue at Second Street : : : : : : Philadelphia, U. S. A.

Boston Agents—Hurricane Engineering Co., 53 State St. Chicago Agents—R. R. Street & Co., 28 No. Clinton St.
Southern Agent—W. A. Kennedy, Charlotte, N. C., and Atlanta, Ga.
Pacific Coast Agents—Alfred H. Bullion Co., 660 Howard St., San Francisco, Cal.

Staley's

Expert Staley Service has improved quality and reduced cost in thousands of textile products.

First, a detailed analysis is made of individual mill conditions and manufacturing requirements. Second, a special starch is compounded for each particular need.

Scientific laboratory facilities, and the most advanced production methods assure absolute maintenance of original specifications in each starch employed.

You, too, can benefit by the application of scientific Staley methods. A member of our consulting staff will be glad to call.

A. E. STALEY MFG. CO.
DECATUR, ILLINOIS

508 Andrews Law Bldg.,
Spartanburg, S. C.
G. A. Dean, Manager.

Ansley Hotel,
Atlanta, Ga.
J. W. Pope, Manager

25 Church St.
New York City
Wm. H. Randolph, Jr., Manager,

88 Broad St.,
Boston, Mass.
L. R. Dickinson, Manager

Starch

Houghton's Warp Conditioner

An Advertisement by Chas. E. Carpenter

HOUGHTON'S WARP CONDITIONER is the last word in this character of product. It is new, yet not revolutionary. It possesses all of the merits of the softeners and tallow products which have gone before plus those niceties of refinement or improvements which make the up-to-the-minute product which it is. It is the result of evolution rather than of revolution. It is the natural consequence of years of experience and unsparing research.

It is one thing to add the desired weight to the yarn in the size and quite another to carry that weight through every process to the finished cloth. HOUGHTON'S WARP CONDITIONER will actually do this. And it will do it better than any other product.

How do we know this?

The Houghton Research Staff obtained the co-operation of six friendly mills, and it was agreed to make an extensive practical test of the principal products used in combination with the starch and size in the conditioning process. But to identify these products only by number, so that in the operation there would be no prejudice on the part of those making the practical test.

The result was 100 per cent in favor of HOUGHTON'S WARP CONDITIONER.

The reader will thus appreciate that HOUGHTON'S WARP CONDITIONER is not a theoretical or laboratory product, but one which has been perfected with the aid and cooperation of the practical mill man.

Not the least of the important properties possessed by this product is its ability to add additional strength to the warp and thus reduce breakage to a minimum heretofore unheard of. This is due to the extraordinary penetrating power and adhesive strength of the CONDITIONER.

It carries the size into the heart of the warp and holds it there, while it also holds the fibers tighter together.

The bleaching and finishing process which reveals the defects of the older type of softeners has no terrors for HOUGHTON'S WARP CONDITIONER, for by its use the defects so generally developed by these processes are reduced to an unconsequential item.

When we were seeking a name for this improved product, for it is an improved product rather than a new one, a mill man suggested that we call it MILL HAPPINESS, as he claimed that it would relieve the average mill man of his greatest worries and make mill life for everyone happier all around.

We might have adopted the suggestion were it not for the fact that the name might mislead some to believe that the product is a quack remedy or secret compound. We are more than anxious that the mill man should realize that we are not dealers in nostrums. Our products are the result of scientific research and not compounds composed of a little of this and a little of that put together by some rule of thumb method.

HOUGHTON'S WARP CONDITIONER is a product which the mill man has wanted for years. At times the softeners and tallow products have come close to supplying the want only to fail in some one or more important detail. This product fails in none.

We feel that a personal interview with one of our representatives will be far more satisfactory than correspondence on this product, and therefore we would suggest that you 'phone or drop a note to the address given below, so that the next time our representative goes over your territory he will make it a point to call on you.

'Phone or write the note now, while it is fresh in your memory.

E. F. HOUGHTON & COMPANY - PHILADELPHIA, PA.

HOUGHTON

OILS and LEATHERS for the TEXTILE INDUSTRY

UCPC

ANILINE COLORS

DIRECT, SULPHUR, ACID, BASIC AND CHROME
including the following new Product

BRILLIANT SULPHUR BLUE T. C. M. CONC.

THE BEST MONEY VALUE BLUE FOR CHAMBRAYS

VELVETEEN PASTE

THE STANDARD BOIL-OFF & DYE BATH ASSISTANT

U. C. TALLOW

THE HIGHEST GRADE OF PURE SIZING TALLOW

KING BRAND SIZING

OUR "K.B" IS A COMPLETE SIZE IN ITSELF. HIGH IN TALLOW

WAX SOFTENER

A SCIENTIFICALLY BLENDED SOFTENER FOR BLEACHED GOODS

UNITED CHEMICAL PRODUCTS CORPORATION

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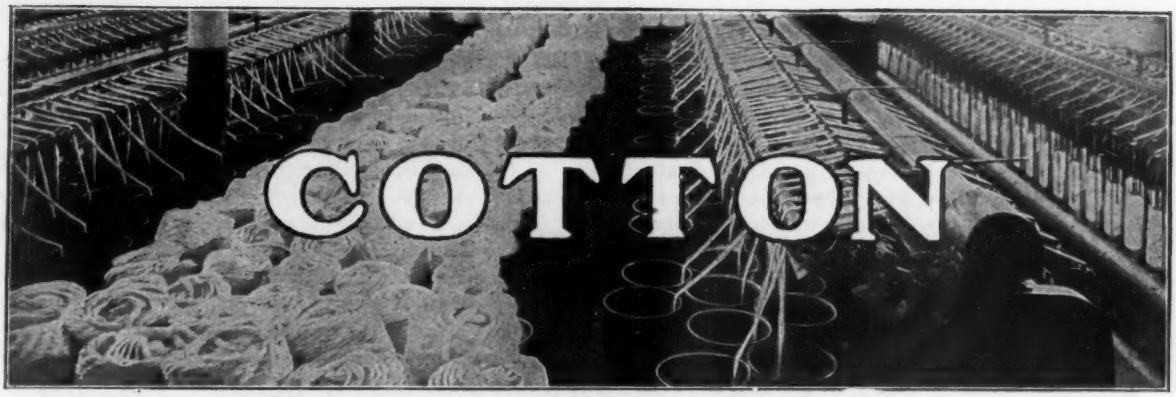


October, Nineteen-Twenty-Four

A Million Federal Pensioners.

Isn't it about time that someone started a little of the sort of rumpus that used to be stirred up constantly about Federal pensions? Or have we reached the stage whereby the only thing to do is hurry along in the pensioning business to the point whereby the problem will solve itself, more or less, through the providing of pensions for everybody?

It is surprising that after all the stir that used to be made about pension grabbing that there should today be on the rolls of the Federal Government approximately one million pensioners. With the Civil War sixty years in the past we have paid out more for pensions on its account in recent years than ever before. With the Spanish-American War twenty-five years gone, we are paying out in pensions every few years on account of it about as much as the war cost. We still are paying pensions on account of the War of 1812 and the War with Mexico in the eighteen forties.

World War pensions to date have cost about $3,000,000,000, with the war only five years in the past. World War pensions? You thought there were no such things? They call them by other names that is all. Those who are supposed to get them really receive a smaller proportion of what is provided than ever was the case with another class of pensioners. Lots of it goes for "administration," wasteful, largely futile and, at least for long, notoriously dishonest.

The way still is open for the World War veterans to demand "pensions" on the ground that "compensation," the "adjusted" and other kinds, and rehabilitation are not pensions. Though Webster and the other dictionary makers don't agree with them, Congress undoubtedly will accept their definition of the words involved—words and nothing more.

President Harding, in vetoing a pension bill less than two years ago, said that the measure meant that the country would be called on to pay out at least fifty billions in pensions during the coming half century. The estimate was a modest one. The bill was again passed by Congress this year and was vetoed by President Coolidge. It or a worse one will be passed by the next Congress, and others by succeeding Congresses. In all probability the Government's pension payments during the fifty years will aggregate more than seventy-five billion dollars.

For it is doubtful if any public man ever gained a vote by fighting a demand for pensions, no matter how extravagant or unjustified that demand happened to be. No one ever failed to gain votes by supporting everyone's demand for pensions—as most men in office do.

Already the pensioning practice has been made to include the civil employees of the Government. It won't be long before there will be an insistent demand that it go outside of service, real and alleged, to the Government, and be made to include large groups of persons who are "deserving" of public support just because they can vote, and want the money—other people's money.

A Changing View as to Population.

A yearning for inhabitants has been a dominant American urge since the founding of the first colonies. More people, ever more people, usually any kind of people has been the cry of the nation and its various units. It accounts for the huge volume that real estate has comprised in our business operations. We have interpreted masses in terms of wealth, and regularly have capitalized prospective increases in population.

Is a changed view now dawning upon us? Have we come to realize that our numbers have grown, if not too rapidly at least too recklessly? Are we beginning subconsciously to realize that we have about as many people as can live comfortably even in this blessed "God's land?"

There are indications that affirmative answers are the proper ones for all of these questions.

The immigration bill passed recently by Congress may not have been, as it appeared, the culmination of what the war disclosed concerning objectionable elements in our population. It was more the product of a quarter of a century's feeling out for a safeguard not only against unnatural growth but also of a too rapid growth in numbers. This ran counter with the exhaustion of our free land supplies and with the close of the true pioneering age in American life.

With our present huge resident population, won't natural increase now amount to the full increase, immigration included, of former years? If this be so we'll leap forward rapidly to that approximately 200,000,000 figure which students of the subject say is the maximum that the country can maintain decently.

But it isn't likely to be so. Even with immigrants substantially barred there is no incentive now for large gross natural increase in population as was the case a few years

back when every "hand," no matter how small, was needed. There is every indication that those "race suicide" tendencies long most evident among the elect of place and fortune are now developing among all classes.

In truth those who gamble, as many have done successfully in the past, on gigantic population increases in this country as a whole very probably will be disappointed.

What we need is not more people but better people.

Is Europe's Restoration Bad for Us?

Now that, in accepting the Dawes plan, the lately warring nations of Europe have come nearer than at any other time to agreeing on a real treaty of peace, the restoration of the Continent on whose troubles we have profited seems to be clearly in prospect. What will be the effect upon us?

Several good economists make haste to claim that it will be as bad as Europe's decay was, in several seeming respects, good for us. Since 1914 we have become a creditor as against a debtor nation, largely if not solely because of the war, which opened to us trade opportunities which would have taken generations of most enterprising effort to develop. Not only has financial supremacy passed to the West but we have sold goods in hundreds of quarters which would have been closed to us had Europe continued sane and stable. Europe now owes us much money, and we are to lend her more for purposes of restoration. This money, presumably, is to be repaid, or, at least, interest is to be paid upon it. How? Europe has little gold, and there is nothing which we need less. Must Europe pay us in goods, cheap goods, to supplant goods made in our own factories? In getting on their feet will the recently warring nations recapture markets which we have taken in whole or in part from them? Succintly, must European restoration mean American recession?

No. To contend otherwise is to defy all the laws of history, economics, and even commonsense itself. As everyone knows, much of our "war prosperity" was false, mere illusion. Some individuals and some industries profited immensely, just as doctors profit from accidents to and diseases of others. Even doctors couldn't profit forever from epidemics or accident or disease. All their patients would die or become so poor that they couldn't pay for service.

That the country actually didn't profit hugely from the war is shown by figures on the national wealth as set forth in these pages a short time ago. Our real wealth did not increase exhorbitantly during the last ten years; in truth, the increase—in real not money wealth—was somewhat below the normal for former periods. One may doubt if the standard of living, except perhaps in the matter of a few more or less questionable luxuries, is any higher now in the United States than it was ten years ago. Figures showing consumption of necessaries would indicate that it isn't. Our per capita consumption of such things as meat, wheat, cotton and their products has remained static or has declined.

Likewise, consumption of the necessaries has declined throughout the world. And the per capita average was never high even before the war; it never was up fully to the desirable even in this country.

This consumption of necessaries—and it is the production of necessaries which engages the energies of most of working humanity—can and should be increased even in the United States. The possibilities as to this among most other people is stupendous. The possession of a full change of simple garments by every person in the world would call probably for a trebling and more of the production of cotton and cotton goods. The extinction of human hunger would require a doubling of present food production.

The world's full consumptive capacity isn't going to be utilized soon but it can be steadily and certainly increased, as was done for a hundred and fifty years prior to the cataclysm which developed in Europe ten years ago.

People can't consume unless they themselves can work and produce; corpses of neither peoples nor individuals consume or produce anything.

Prior to the war, as since then, Europe was our best customer. However, Europe took from us raw materials in the main. Europe probably will take from us henceforth less and less of raw materials, and no great volume of manufactured goods, barring, perhaps, machinery. But a restored Europe will buy raw materials in increasing quantities from other countries, with money that can be spent in larger volume both for our and Europe's manufactured goods. Grain and meats taken by Europe from Argentina, Canada and Australia mean markets for us as well as Europe in those countries for cotton goods and shoes and automobiles. And much that Europe owes us can be paid not in European goods but in goods acquired in all parts of the world.

Moreover, as Europe gets on its feet there will be a raising of living standards there, which means wage scales more nearly approaching those prevailing in America. One of the demoralizing factors in world trade in recent years has been the goods made by starving peoples and dumped by necessity at any price into the marts of trade.

European restoration will bring with it some difficult problems for the American producer, but these will bear on healthy factors and not on destruction and decay as have most of the problems produced by Europe during the last ten years.

Presperity, sanity, construction never yet hurt anybody, no matter where it prevailed.

Greenville's Visitors.

It is not amiss to again call attention here to the prospects of the Sixth Southern Textile Exposition which will open in Greenville on Monday, October 20th, and continue throughout the week.

It is indicated that more than the usual attendance of mill men from the South, and machinery and supply representatives will be on hand. In addition to these, there undoubtedly will be present a number of visitors who will combine a visit to the Exposition with their first trip into the southern section of the country. The date of the Show is rather propitious in one respect, coming after a period of months of unprecedented publicity regarding the South and its resources and potentialities in textile lines. This publicity has gone into all parts of the country and has been received with interest—particularly in the New England section. It would not be surprising, therefore, if a representative number of mill men from "down East" are among those present, many on their initial visit.

For the initiate, the Greenville Show, Greenville itself, and the surrounding territory, will prove indeed a revelation. It is within the province of the South to welcome these visitors—and southern hospitality will surely provide them with most pleasant recollections.

The recently opened plant of the Gregg Dyeing Company, at Graniteville, South Carolina, represents the largest installation of dyeing and finishing machinery in range in the world devoted exclusively to the production of sulphur khaki work. It is a model of modern finishing practice, equipped throughout with the last word in machinery and process, and was designed with the aim of complete efficiency. The capacity is a half a million yards a week.

Within the past several years southern textile leaders have advocated, in addition to diversification in the products of the mills, the extension of processing facilities. It has been pointed out that by bringing the southern mills nearer to the consumer, through local finishing plants to prepare the South's products for the market, the industry can be established as a well-rounded and more balanced economic entity.

The founders of the Gregg dye plant have definitely acted along the line of foresight and business acumen underlying the advocacy of this movement. The plant was established to finish the products of the Graniteville Manufacturing Company, with four mills in South Carolina, and the Sibley Manufacturing Company, Enterprise Manufacturing Company, and the Augusta Factory, of Augusta, Georgia. The McCampbell Department of Harding, Tilton & Company markets the cloth from these mills. The manufacturing plants are located in close proximity to one another, and it was felt that to establish the finishing plant at the mills, finishing the cloth complete for use, economy in transportation and expendiency in handling orders would be a double objective to be secured. Therefore, the Gregg Dyeing Company, a separate corporation, was organized.

The Horse Creek Valley, in which a large part of this mill system is located, is replete with southern textile history and romance. Possibly no southern mill development has a history more abounding in achievement and industrial romance than that to be found in the development of the mills along the banks of this power-giving stream. Among the outstanding figures in pioneer southern cotton manufacturing, that of William Gregg stands out as one of the premiere founders of the industry in this section. It was at Graniteville that William Gregg, in 1845, established his first little cotton mill. And now, almost on the identical site of his modest venture into the field, stands this modern, efficient dye plant which in truth represents the rounding out into a complete manufacturing unit of the extensive mill properties which have developed through the years from the foresight and faith of William Gregg in the possibilities of cotton manufacturing in the South.

There seems to be, in the textile industry today, an incomplete recognition of the important role played by William Gregg in the establishment of cotton manufacturing in the South. While this article has for its chief consideration a description of the finishing plant named in his honor, still, because of the uncanny foresight and wisdom of the man who, almost alone, was responsible for the tremendous manufacturing development that provides its setting, more than passing attention will be given to William Gregg as one of those to whom the South is largely responsible for the vital economic factor in her life represented by the southern cotton mill.

In the disrupted economic conditions of the South which accompanied the Civil War period, says Broadus Mitchell in "The Rise of Cotton Mills in the South," William Gregg "stood head and shoulders above other southerners of his time in public mindedness, in breadth of view, in qualities of imagination, in sanity of judgment that did not sacrifice understanding of his misguided contemporaries, in power of analysis of the confronting situation." Another writer states that "modern cotton manufacturing in the South dates from the founding of Graniteville rather than from the post-bellum period."

With a foresight almost without parallel, Gregg recognized the potentialities of the South as a cotton manufacturing section. In addition to his own definite efforts in establishing a plant for this purpose, he most earnestly advocated this as the hope of the South. In 1845 he declared that, "Since the discovery that cotton would mature in South Carolina, she has reaped a golden harvest; but it is feared it has proved a curse rather than a blessing, and I believe she would at this day be in a far better condition

had the discovery never been made. Let us begin at once, before it is too late, to bring about a change in our industrial pursuits . . . let croakers against enterprise be silenced. . ." The future of the South became almost a passion with him, and he lent every power at his command to the upbuilding of the section.

Gregg's keen analytical ability is shown in his warning when he told the South "that as surely as she separated from the Union, she would find herself economically unequipped to maintain her position," Dr. Mitchell points out, and continues, "His words were realized with bitter force. The trial of the war showed how far industry had been neglected. * * * When cotton could no longer bring in the manufactures of others, the South was left without essentials."

One of the truly great men to be claimed by the industry, Gregg stood as the exponent of an industrial creed, the wisdom of which is recognized today. His successors at Graniteville, working under the inspiration and example of their illustrious predecessor, have now achieved a self-contained industrial unit, culminating in the establishment of the dye plant, that surely exemplifies the possibilities in which William Gregg placed abounding and justified faith.

As a fitting co-incidence, in the yard of the new finishing plant, given its name in honor of this venerable pioneer, there stands a handsome monument erected to his memory by those who have succeeded to the management of the system begun by him.

In this article, it is intended to describe, by photograph and text, this modern finishing plant with its equipment.

The building itself is worthy of especial mention as it was designed with the aim of providing a plant consonant with the efficiency of the equipment to be housed in it. The building, over all, is 375 feet in length and 124 feet in width, of re-inforced concrete with steel sash construction and monitor roof. A basement runs the entire length of the building, and extends half the width, making it 375 by 62 feet in dimensions. Lawrence Construction Company, of Augusta, Ga., were the contractors for the building, and J. E. Sirrine & Company, Greenville, S. C., were the engineers and architects for the plant.

A prime requisite of finishing is plenty of good water. Here we have an adequate supply, the chemical analysis of which shows it to be splendidly adapted to the purpose, and as an additional safeguard the Gregg Dyeing Company is equipped with a modern filtration plant located on its premises. This plant consists of a battery of three large filter tanks, giving a capacity of 900 gallons per minute. The filter tanks were installed by the Roberts Filter Mfg. Company, of Darby, Pennsylvania. A 60,000-gallon elevated storage tank built by the Chicago Bridge & Iron Works, Chicago, Illinois, is included in the filter unit, which is operated by a 1,000-gallon pump and 50-hp. motor furnished by the Allis-Chalmers Mfg. Company, Milwaukee, Wisconsin. This plant produces sufficient filtered water for the various processes in the dyeing and finishing.

Graniteville is not furnished with municipal gas service, and to provide gas for the singers, the company has installed a 20th Century gas generator supplied by the C. M. Kemp Manufacturing Company, of Baltimore, Maryland. This generator is fed from a 10,000-gallon gasoline storage tank located underground outside the building.

Cloth for finishing is received from a railroad siding on a concrete platform and is trucked into the grey room, in the basement of the building, where the bales are opened and the cloth ends sewn together. Three Rainer & Lincoln sewing machines, secured from the Dinsmore Manufacturing Company, Salem, Massachusetts, are used for this purpose. The plant has two large motor-driven sewing machines, and one smaller machine which is hand-operated.

The grey room is located directly under the singer room, and the grey cloth is taken through the floor into the singers, which are located in a fireproof room on the main floor of the building. This feature eliminates the necessity for trucking and constitutes a part of the continuous system of processing which lends to the efficiency of the plant.

Through apertures in the singer-room wall, the cloth goes into the diastafor machine, which is equipped with Tycos temperature control, operated from a central station, for maintaining the desired constant temperature in the bath throughout the run.

From the diastafor machine, the cloth passes into several piling machines where it remains for a sufficient time for the malt extract to convert the starch in the cloth. From here it goes into a four-box washer and a horizontal drying machine containing 51 cans, after which it is ready for the dyeing process.

The entire range of equipment thus far described is directly connected in line, so that the cloth, leaving the grey room downstairs, passes up through the singer, the malting machine, the piling machines and the washing and drying, and is presented ready for the dyeing process, in one continuous line that represents one of the longest ranges of the kind in America.

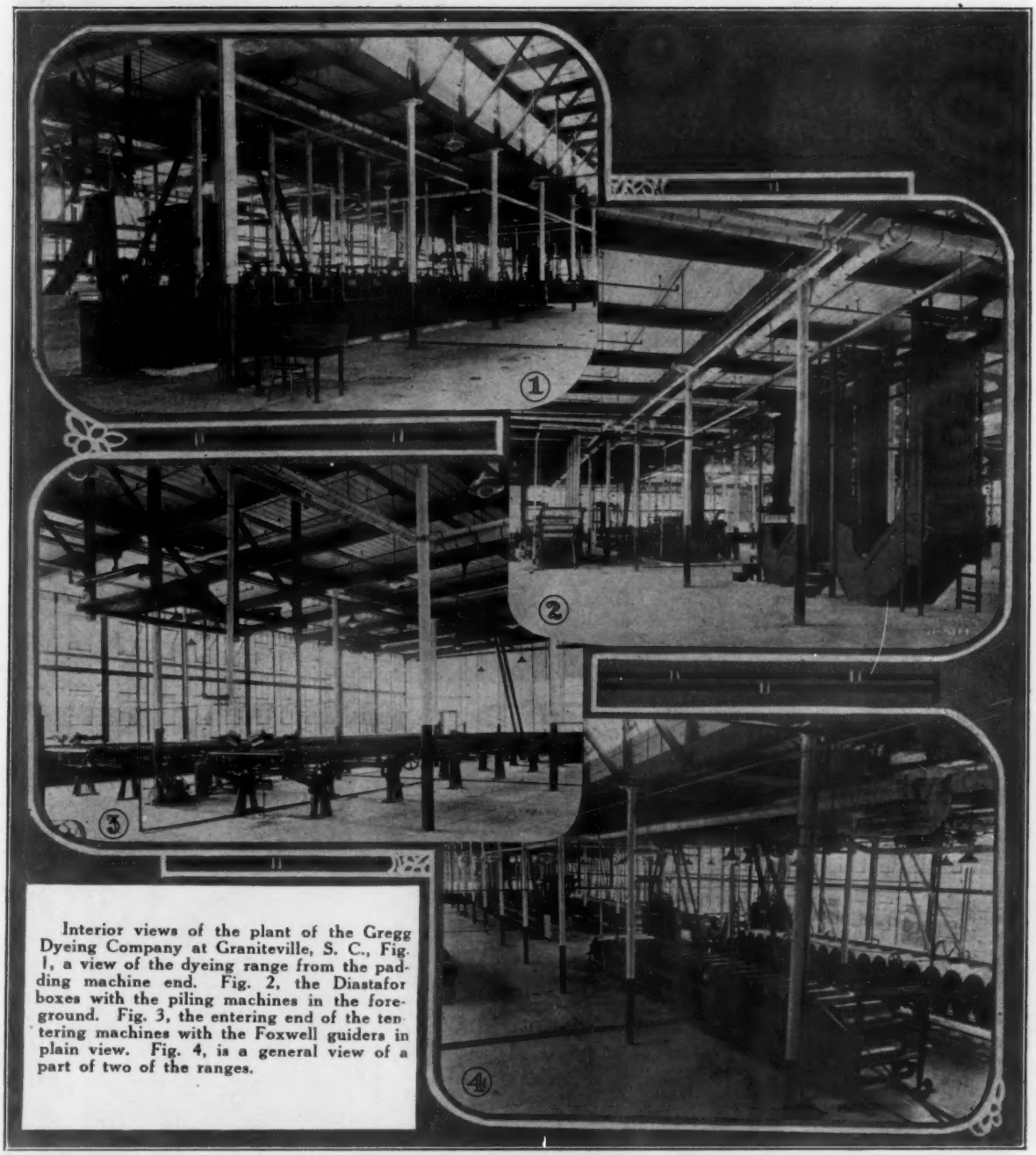
These processes carry the cloth to the opposite end of the building from that which it enters, and, ready for the dyeing, it is only required to transfer the trucks of goods across to the starting end of the dyeing and finishing range, which carries the cloth in the opposite direction paralleling the first range.

The dyeing range consists of a three-roll padding machine, an eight-box washer, and a set of horizontal dry cans. The cloth passes through the dye machine, goes up over an oxidizing frame, and passes into the after-treatment and drying. The dye-box and after-treatment box likewise are equipped with Tycos temperature controls to maintain constant temperature at these points.

Passing from the dyeing range, the cloth goes into the finishing processes, where it is taken through a starch mangle equipped with temperature control, over horizontal dry cans, through a Curtis & Marble twilling machine, and then through the tenter frame equipped with the Simpson cloth winder, and it is then ready for the cloth room and to be packed and shipped.

The machinery in this line, from its entrance into the dye machine to its removal from the tenter frame, constitutes another continuous range through which the cloth passes without interruption.

In connection with the dyeing and finishing range, there are two features in the Gregg plant that especially indicate the efficiency of the processes. A hand-controlled Reeves variable speed transmission is operated at the dyeing range to take care of differences in tension between the padder and the washing machine. As the cloth leaves the dry cans after coming from the starch mangle in the finishing range, it passes under a compensating roll, which automatically operates another Reeves variable speed transmission which in turn controls the speed of the tenter frame. As the tex-



Interior views of the plant of the Gregg Dyeing Company at Graniteville, S. C., Fig. 1, a view of the dyeing range from the padding machine end. Fig. 2, the Diastafor boxes with the piling machines in the foreground. Fig. 3, the entering end of the tentering machines with the Foxwell guiders in plain view. Fig. 4, is a general view of a part of two of the ranges.

ture of the goods changes, or the tension of the cloth coming under the compensator roll varies, the compensator rises or falls, which, by means of wire connections, either speeds up or slows down the Reeves equipment, which regulates the speed of the tenter frame in accordance with the tension variation from the dry cans.

In usual practice the steam box for the tenter frame is placed underneath the tenter at the entrance end. At the Gregg plant, however, a departure is made from this in that the steam box is suspended from the ceiling between the twilling machines and the tenter. This is done to reduce as far as possible the chance of streaked goods at the tenter frame.

Another item of efficient practice as instituted in the Gregg plant is that all dyestuffs and chemicals are stored and prepared in a room separated from the main processing room. In addition to the several obvious advantages to be secured by this method, it also removes the stored materials from proximity with the process.

The rolls from the tenter frame are taken into the cloth room where the cloth is folded, baled and marked ready for shipment, and the cloth room is so located that trucking onto the loading platform is done in a simple manner. The building is so designed that the finished goods are loaded into cars for shipment from the same platform on which the grey cloth is received.

The plant includes two duplicate lines of the machinery that has been described, and the cloth is processed at a rate

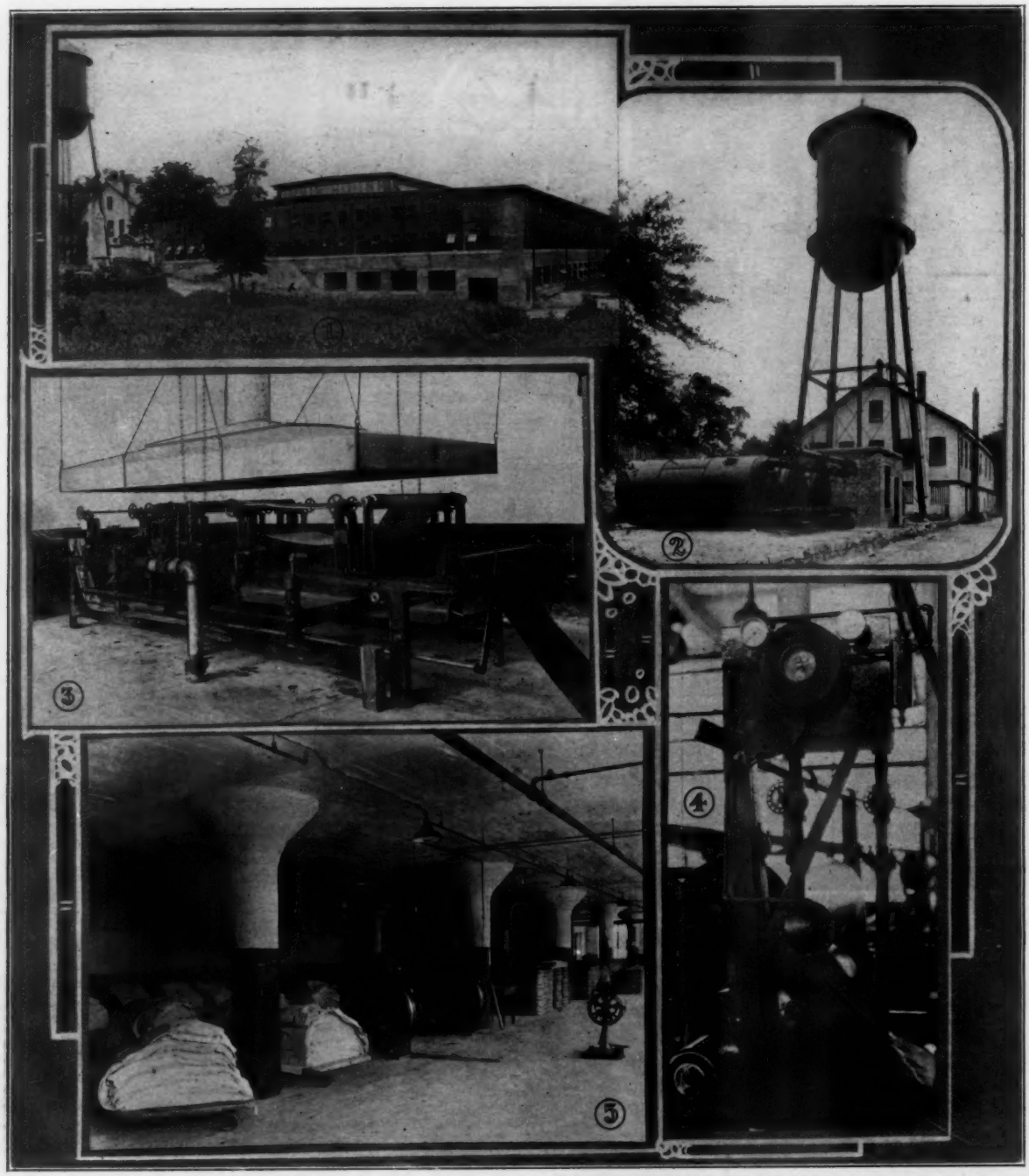


Fig. 1 is another exterior view of the new plant of the Gregg Dyeing Company at Graniteville, S. C. In the basement here shown is located the opening and sewing room shown in Fig. 5. Fig. 2 shows the water storage tank and the filtration plant. Fig. 3 is the gas singer and Fig. 4 a close-up of one of the several temperature control units.

of 80 yards per minute, giving the plant a capacity of 500,000 yards a week with both ranges, as previously indicated. The ranges of machinery installed in the plant were furnished in their entirety by H. W. Butterworth & Sons Company, of Philadelphia, Pennsylvania, and Greenville, South Carolina. The ranges are equipped with Foxwell guiders where necessary.

Motor equipment for the plant was furnished by the Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin; the fire extinguishing system was installed by the Grinnell Company; steam and process piping by the Parks-Cramer Company, of Fitchburg, Mass., and Charlotte, N. C.; electrical work by R. H. Bouligny & Company, Charlotte, N. C.; steel sash by the Truscon Steel Company; three large silent chain drives, by Morse Chain Company, Ithaca, N. Y., and Charlotte, N. C.; cloth room machinery by Curtis & Marble Machine Co., Worcester, Mass. The motor equip-

ment on the Butterworth machinery was furnished by the Link-Belt Company, and the temperature control apparatus by Taylor Instrument Companies. The cast iron columns used in the building construction were furnished by the American Cast Iron Pipe Co., of Birmingham, Ala.; while the cloth presses and floor scales in the cloth room were made by the Bushnell Mfg. Co., and the American Kron Scale Co., respectively.

The officers of the Gregg Dyeing Company are: Coles Phinizy, president; Carroll Magarahan, secretary-treasurer; Jerome A. Franklin, superintendent, and Warren K. Cadmus, office manager.

A New Tension Device for Section Beams on Slasher Creels

BY A. DUNHILL MARSDON.

The commonest method of laying in a set on a slasher creel is to mount the section beams so that they alternately rotate in opposite directions, beginning with the first beam in the set, and to wrap the yarn over and under all beams on its way to the size-box.

This is sometimes varied by taking the yarn from each upper beam in the creel direct to the size-box, allowing the yarn from each lower beam behind the upper one to run over the upper one, and so to the size-box. On very large sets where this method of splitting up the set is used, sometimes the yarn from two or three adjacent upper and lower beams will be run as a unit; the yarn going from the last upper beam in each unit to the size-box.

The first method is almost universally used on coarse work where the warps are heavy and strong. The second method is often used on fine warps that are easily broken, as the first method of creeling is very hard on the yarn.

When the first method is used, all beams are virtually locked together like so many pulleys run by a belt common to them all. Usually the back beam of a small set, or the two back ones of a large set are braked with a weighted rope passed over the groove in the beam head. Three or four, or even all the beams may sometimes be individually braked, but usually not. If the two back ones are braked, the friction of the yarn passing over the others will brake them enough to prevent overrunning when the slasher is stopped, and it is very difficult to brake intermediate beams without putting too much strain on the yarn from the back

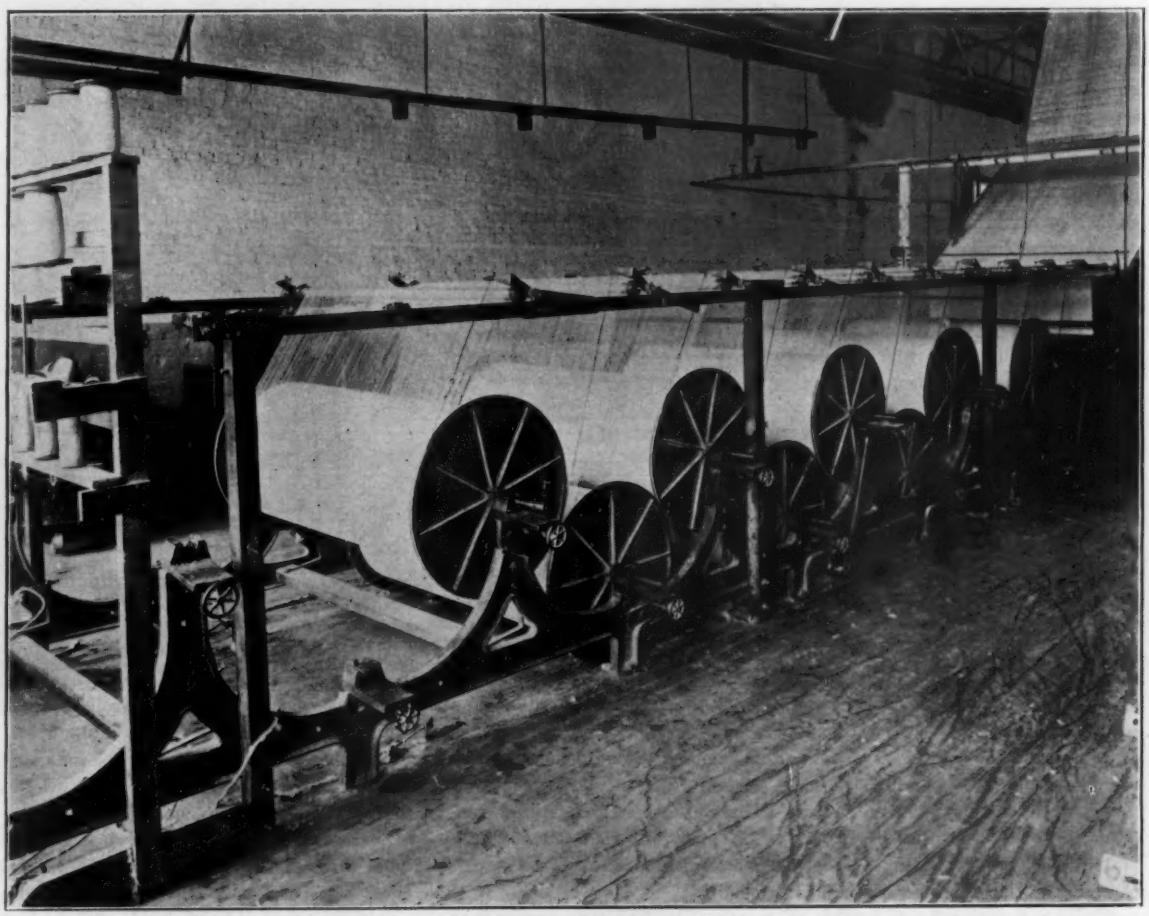
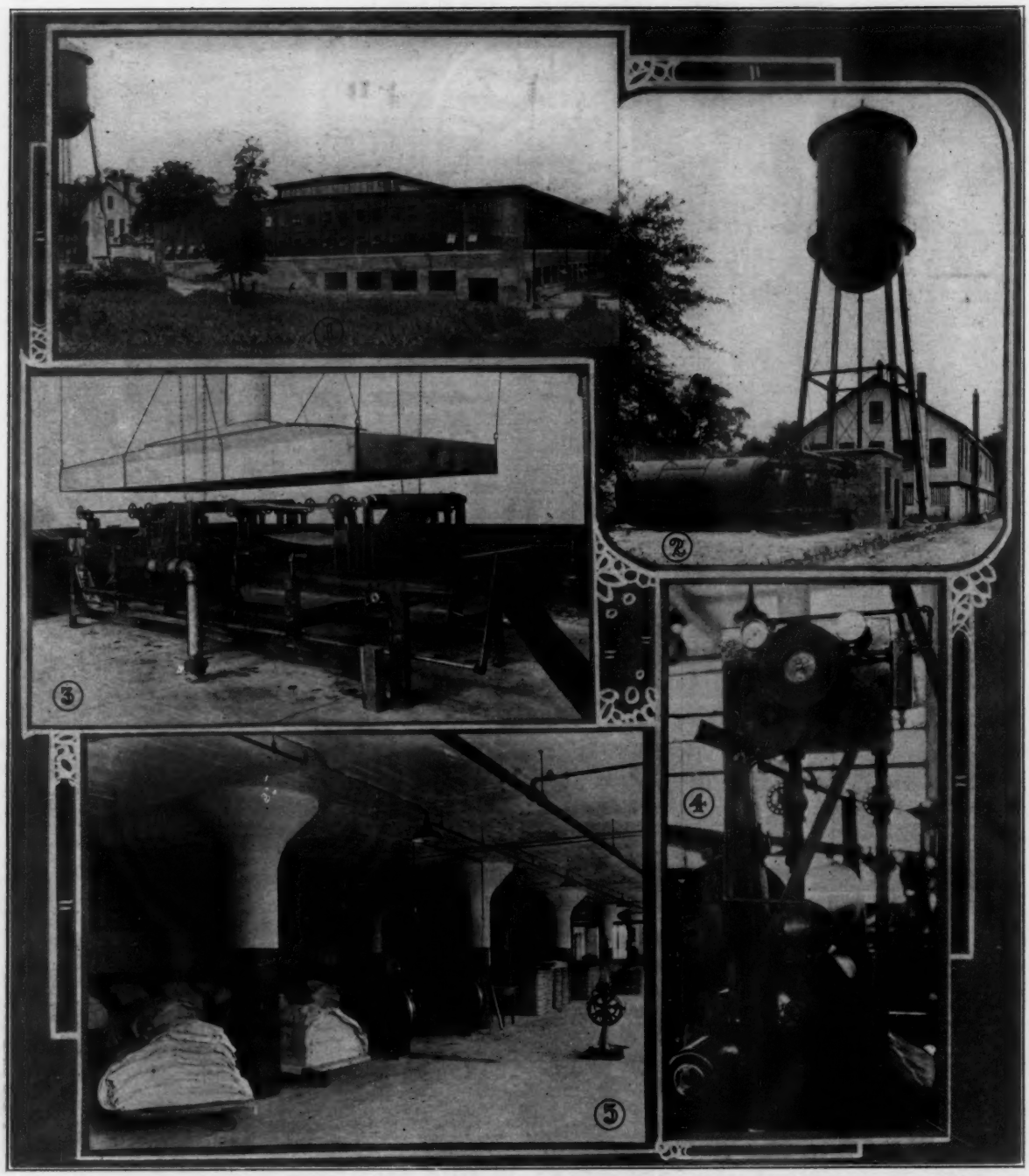


Fig. 1. The tension device is shown just above each section beam with the brake cords running from the short lever to the beam heads.



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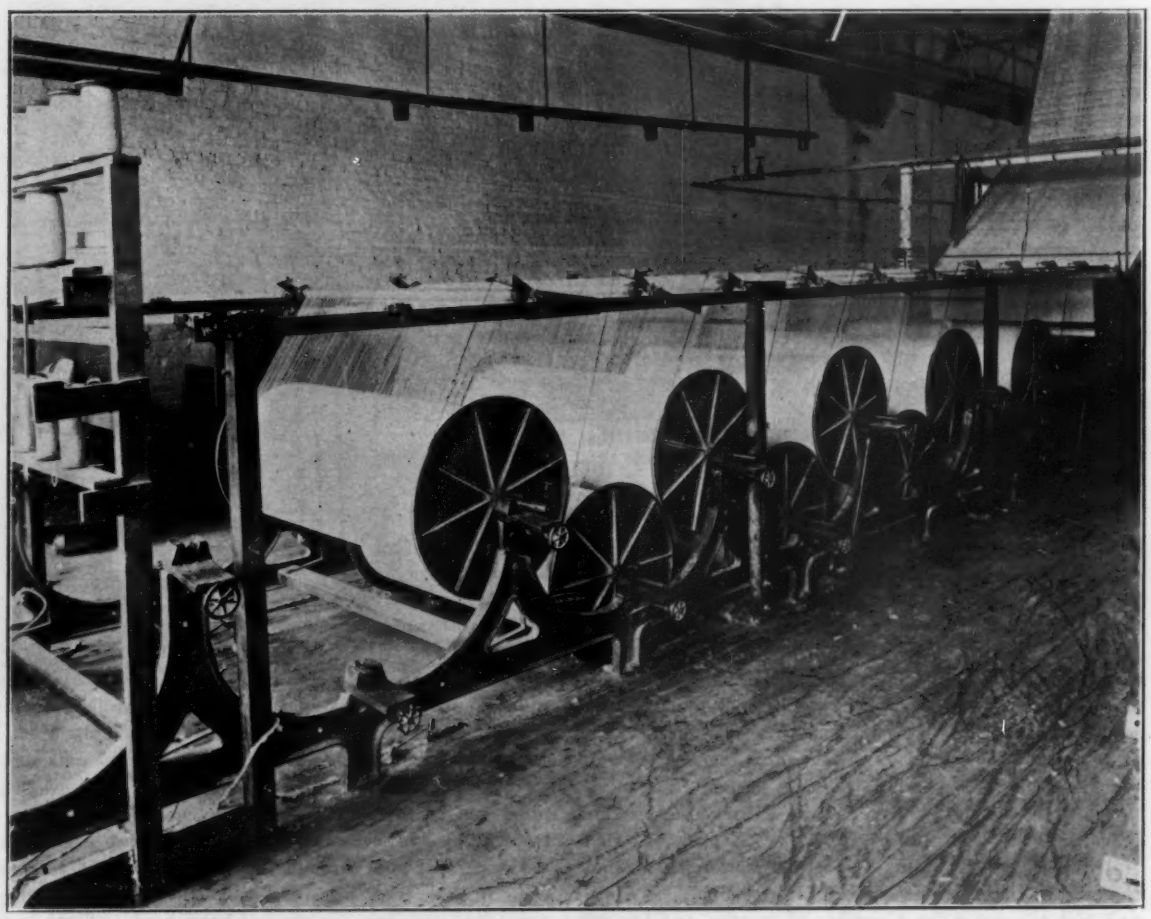

Fig. 1. The tension device is shown just above each section beam with the brake cords running from the short lever to the beam heads.

beams, which not only has to pull the back beams but help pull all the others.

Now, obviously, if only one or two of the back beams are braked, there will be much more tension in the yarn drawn from those beams than in that from any of the others. Similarly, if an attempt is made to weight more beams, the yarn from the back ones will always have the most tension in it, because as just pointed out, this yarn has to help pull all intermediate beams, and the more they are weighted the more the yarn from the back beams will be stretched in pulling them.

It is, therefore, impossible with this method of creeling a slasher to get the sheets of yarn from the different section beams into the size with the same tension in each sheet. The yarn that enters the size under the greatest tension will be more brittle and less elastic than yarn sized under less tension. The loom beam will therefore have on it yarn that is very non-uniform as to tension, elasticity and stretch. On very heavy yarns, these inequalities may not amount to anything in the weaving, but on light work it is easy enough to take the life out of warp by stretching it while it is being sized, and weaving trouble will result.

This way of creeling also has other objections. One serious objection is that crooked section beam barrels, or bent gudgeons in beams, causing them to run eccentrically will stretch the yarn badly due to this eccentricity. As the beams are all belted together by the yarn, each time the eccentric beam rotates it alternately stretches and slackens the yarn running over it. This is one of the worst nuisances in a slasher room. The only way to remedy it is to true up the beam, and when it is in the creel nothing can be done about it. When it runs out it will too often find its way back into the warper room instead of the repair shop. If the eccentricity is due to a bent gudgeon, the sweep is all on one end, and the beam will very likely throw a lot of slack selvage into the loom beam, as well as weaken the yarn by excessive stretch.

Another objection to this method of laying-in is that laps are hard to get at. On a large set there is a great deal of yarn from other beams passing over the beam on which the lap has to be cleared up, and this yarn has to be kept out of the way while working on the lap. Also, as there is yarn running from one beam to another it is impossible to get in between these beams, and all work has to be done leaning over from the side of the creel.

The most serious objection, however, in the minds of many, is that this irregular tension causes a large amount of soft waste due to throwing in some ends too tight and some too slack. This soft waste is always a nuisance, and often a really serious problem. No superintendent likes to run his carding and spinning to make slasher waste.

To overcome these difficulties, an entirely new method of creeling has been devised by W. W. Arnold, Jr., General Superintendent of the Manchester Cotton Mills, Manchester, Ga. Mr. Arnold has had all of his slashers equipped with his device for a number of months, and has run over a million pounds of warp by this method since it was worked out to his satisfaction. It is a very practical arrangement that has been most thoroughly tested out in daily use in a good-sized mill.

Figure 1 shows the device as applied to one of the slashers in the Manchester Cotton Mills. The salient features of it are: All beams rotate in the same direction; the yarn is taken direct from each beam to the size-box; no beam has any connection whatever with any other beam; each sheet of yarn has an automatic, compensating tension mechanism applied to it that gives at all times a perfectly uniform and constant tension in the yarn, no matter whether the beam is full or empty; no overrunning can occur when the slasher stops, as heavy braking is applied to both heads of each beam at once, automatically; and in starting the cylinders there is no danger of injuring the warp by jerking it, as the moment the warp is pulled at all, the braking ropes are automatically released.

As can be seen from the illustration, the device consists essentially of a framework built over the slasher creel and on which a number of rollers are mounted, one over each section beam.

The yarn passes from the beam over the roller just above the beam, and from there to the size-box direct, simply resting of its own weight on all other rollers except the one next in front of it, on which a slight pressure is caused by the tension arrangement. This is so slight that it amounts to nothing.

The tension mechanism, which is the principal feature of the invention, is shown in detail in Figure 2. The yarn, as

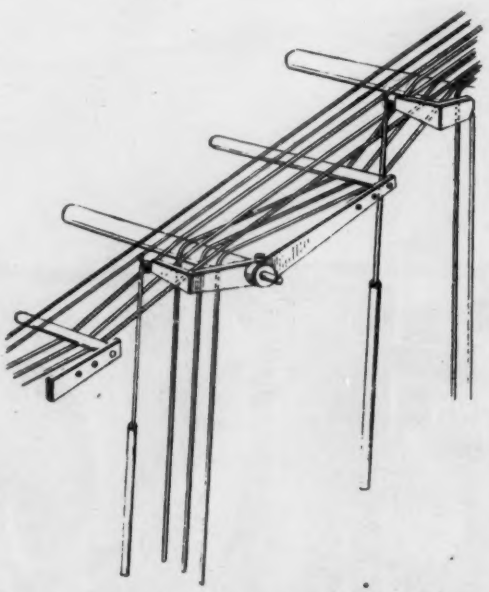

Fig. 2. A perspective drawing showing how the tension of the yarn operates the device.

will be noted, after passing over the large roller just described, passes under a small roller which rests upon it and goes up and down with the yarn after the manner of a slack-roll. The yarn is then carried over the next large roller and on to the size-box. The small floating roller is mounted on two lever arms, which in turn are mounted on the shaft that goes through the large roller. On the back ends of these lever arms are hooks that hold the braking ropes that pass over the grooved beam heads. These levers are not fastened to the shaft of the large roller. They are free to move independently of each other to allow the floating roller to conform to irregularities in the warp.

It will be noted that each section beam has two braking ropes. This gives very positive and powerful braking when the set is stopped, yet the brakes are entirely released by a very slight pull on the yarn, allowing the beam to turn freely.

The operation of the device is at once clear. The small floating rollers will be raised by the pull of the yarn in starting the cylinders. This at once removes all friction from the beams, allowing them to start promptly and without strain on the yarn. As soon as the beam begins to deliver yarn faster than the slasher will take it, this floating roller, falling to take up the slack will brake the beam slightly and bring it down to the correct speed. The whole operation is entirely automatic and fool-proof. There are no tension springs, friction plates or variable dingbats to be adjusted, or mis-adjusted.

It is impossible to get any more or less tension in the warp than that due to the weight of the floating roller, which weight is fixed for a certain range of warps, and can be changed only by a foreman or under his direction. The floating roller simply runs of its own accord in a position that will keep enough friction on the beams to keep it in that position.

This floating roller also acts as a cushion to absorb jerks in starting the slasher. The yarn cannot be injured by a sudden jerk, as there is enough slack held by this roller to take up the shock, and raising the roller at once releases the beam so that it can turn freely.

The tension is fully compensating to take care of full or empty beams, as the floating roller will automatically run in a position that brakes the beam sufficiently to hold it in that position. It makes no difference what amount of braking this may be, the nature of the operation of the device supplies it instantly and automatically.

This matter of regulating the weighting of beams as the yarn runs out is one of the most serious and difficult problems of the slasher room, as the weight must be constantly diminished as the beam gets smaller, and great judgment on the part of the slasher room foreman is required to tell just what this weighting should be. Then, even if a carefully worked out system of weighting is used, a tender may forget to change the weights at the proper time, or some of the ropes may get wet and put an excessive amount of friction on the head even where the weight is supposedly correct.

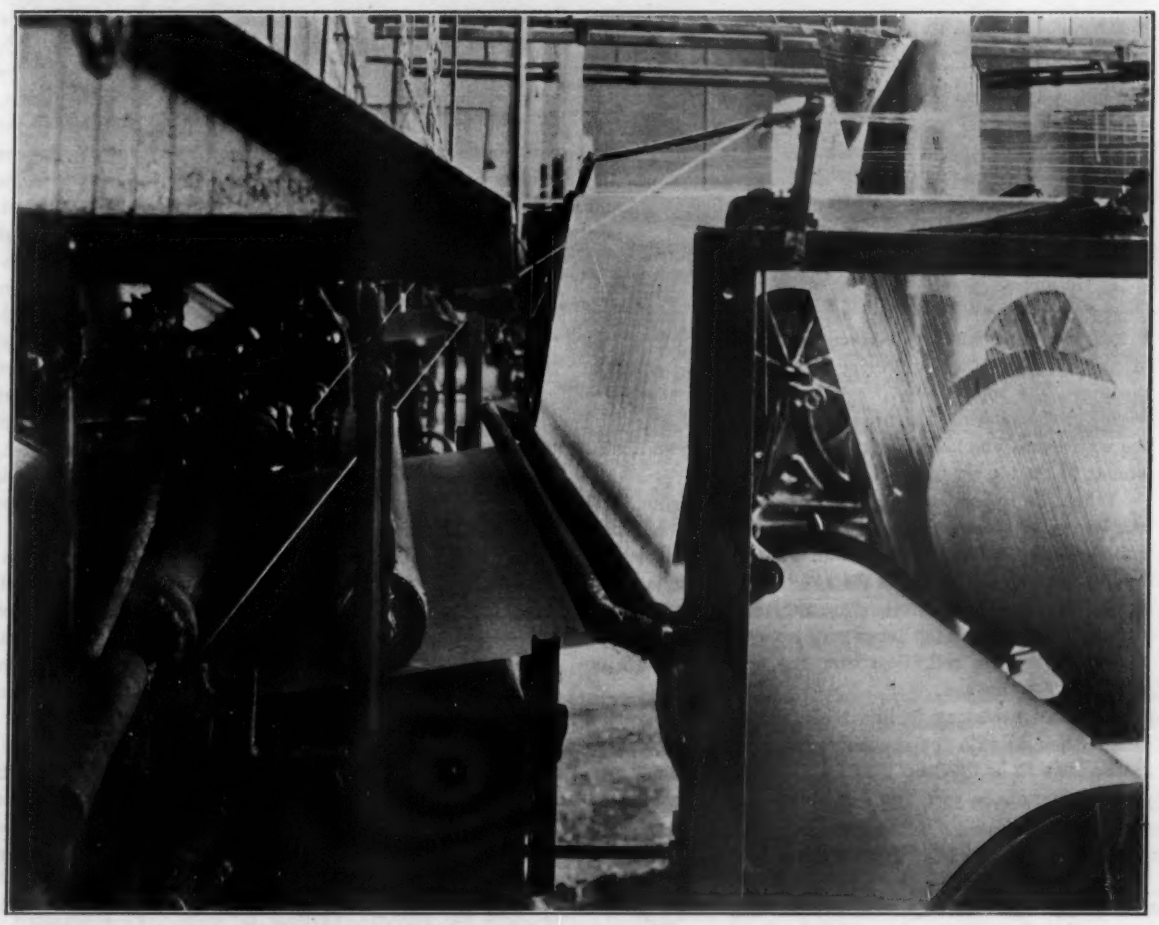

Fig. 3. The roll device to aid in picking the lease is seen attached to the uprights just in front of the size box.

When stopping the slasher, even if this is done suddenly, there can be no overrunning, as the friction then applied to each beam head is much greater than any that would ordinarily be used on the back beams where sets are creeled in the usual way.

Crooked beams, or those with bent gudgeons, will run as well as perfect beams with this mechanism. The eccentricity of the beam is compensated for by the floating roller, which rises and falls with the rotation of the beam. It makes no difference if the beam has both gudgeons bent in opposite directions. The floating roller will still follow the contour of the warp and brake the beam correctly. This roller will also compensate in a measure for high-sided beams which will sometimes come from the warpers.

A lap occurring can be located and cleared much easier with this arrangement. The various sheets of yarn being displayed separately in full view of the tender, the lap can be located at a glance. Then, as there is no yarn from other beams in the way, the lap can be cleared very readily. If the section beams have run down slightly, it is possible to get a leg between them, which is a big help in working on a lap in the center of a beam.

Figure 3 shows the arrangement of the front rollers for introducing the yarn into the size-box. For mills that pick the leese on the back of the slasher, the arrangement used by Mr. Arnold will be found very convenient. Two parallel rolls, which may be seen in the illustration, are suitably mounted in relation to the warp so that they can be thrown over to expose the yarn in the most accessible and convenient position for counting the leese, and at such an angle that the yarn may easily be slid over the polished brass roller as it is counted.

A leese may be counted in very rapidly this way, as the yarn passes overhead, and two men can get in between the first section beam and the leese picking attachment, and as the yarn is exposed at the most convenient angle to the line of vision the men can work fast.

Laying in a new set is quite as simple with this arrangement as with the old. Each roller and tension mechanism is built as a unit, and may be removed by simply lifting out of the stands on the supporting rail, these being open at the top. The rollers may be all hung by their shafts together at the front of the frame, where they will be out of the way, or may be taken off the frame and hung on a rack similar to the lap trucks used in the picker room.

When the rollers are removed, the chain block, or hoist can be run in between the sides of the frame, which is now quite open. All beams are laid in in the same direction; not reversed alternately as in the usual way. As soon as the beams are in place, the rollers are replaced in their stands and the yarn from each beam run up over its roller and under the floating roll, then over the next roller and on direct to the size-box.

It is not necessary to line beams up as carefully with this method as with the common arrangement. Ordinarily beams have to be lined up perfectly with each other to prevent chafing of the yarn from one beam rubbing against the head of another, and also to keep yarn from packing up at the selvage. With this method, the beams will run as well if out of line an inch or more. This much is not recommended however, as it will result in too much crossed yarn going through the size and being hard to split out in front.

It is quite possible, however, with this method, to eliminate the adjusting screws on the creel. These may be lined up correctly once, and then fixed in position with a locknut. Any beams that are very much off length can be put in a lathe and the nuts on each end dressed down to make the beam fit in the creel properly.

The elimination of this adjustable feature will stop a lot of bad work in many cases. It is very easy in lining up a set to screw up too tight on the adjustment and jam the beam to where it is working against more friction than as if it had a rope on it. In fact tenders will sometimes jam beams purposely to take up slack caused by a high-sided beam.

Mr. Arnold has obtained some very interesting and excellent results from this method of running his section beams. The weaving is running better than ever before, with less stoppage from broken warp, and the soft waste is less than half what it formerly was. Sizing the yarn under a very slight tension preserves all of its elasticity, and as the tension is uniform for all sheets of yarn in the set, it is much easier to set the loom tension. Better prepared warps naturally lead to better weaving.

This device will run off the yarn on each section beam just as it was put on by the warper. It therefore gives a reliable check on the warping. Ordinarily, the excessive stretch in the yarn coming from the weighted back beams causes them to run out last, unless they were warped short, so that unless some system was used for running beams from the same warper in the same relative position on the slasher all the time, it was difficult to say whether the soft waste was due to poor warping or poor slashing. However, where warps will run off exactly as they are put on, the trouble with long or short warps can be traced right back to the warper at fault and it can be fixed. The warper tenders are more likely to be careful, too, when they know that the blame for a long or short beam cannot be shifted.

It is worth noting that on large sets, this method of creeling saves a considerable amount of yarn from the nature of its construction. It is approximately twenty inches from center to center of section beams measured horizontally. Due to the staggering of the beams however, it is about thirty-two inches from the center of the top of the barrel of the top beam to the center of the bottom of the barrel of the bottom beam. This requires an extra foot of yarn from each beam to make the under-and-over wraps. In a ten-beam set this would mean forty-five feet, or fifteen yards of warp used up merely in making the necessary wraps around the section beams.

On 4,900 ends of 14's yarn, which is one of the commonest sets they run at the Manchester Cotton Mills, this will mean an initial saving of three-quarters of a pound of waste, approximately, on each set simply through the elimination of the wasteful wrapping of the yarn around the beams. This is about 225 pounds of waste a year per slasher, which in itself is a very neat little economy.

Fabrics and How to Know Them, by Grace Goldena Denny, A. M., Assistant Professor of Home Economics, University of Washington, Seattle. 146 pages; 49 illustrations and bibliography. J. P. Lippincott Company, Philadelphia, Pa., publishers. Price, $1.50 per copy.

This is a very useful handbook of definitions of textile fabrics and terms relating to fabrics, and of practical textile tests, which provides usable information about staple fabrics on the retail market. Part One gives understandable definitions of many fabrics and terms pertaining to them; Part Two includes tests which represent the cumulative knowledge of a large number of experts; and Part Three is a classification of fabrics by cloth structure and by trade name.

The definitions given are limited to fabrics which are sold by the yard, and cover only materials on the American market. Fabrics recognized as staple or standard have been chosen and as far as possible novelties have been eliminated. "Brand" names have not been included except to denote fabrics which could not be described without using such names. The illustrations show representative examples of fabrics. This should be a useful handbook for anyone interested in buying, selling or manufacturing textiles.

Sixth Southern Textile Exhibition

It would seem a platitude to forecast each Southern Textile Exposition as "the best ever" if the event did not always justify such a prediction. It has been the record of each of the five shows already held to supercede all of its predecessors.

There is every reason this year to warrant an increased and greater expectation, and very definite indications are that the exposition will prove an entire success. It appears that not only will it be successful within itself but that also it will mark a progressive milestone for textile expositions.

The show—which will be the Sixth Southern Textile Exposition—will open on Monday, October the 20th, and will continue throughout the week, closing on Saturday night, the 25th. It will be located in Textile Hall, the imposing home of the event, in Greenville, South Carolina.

So great was the demand for space at this year's exhibition that it became necessary, months beforehand, to provide an annex to house the overflow of exhibits even after the commodious Hall itself had been filled to the limit. This annex, erected for the occasion but nonetheless durable and attractive, is located at one side of the Hall, and is connected with it by a sufficient number of passageways to permit egress and ingress without confusion. It is anticipated that the annex, which will contain the lighter types of displays of accessories and supplies, etc., will be a popular section during the week.

In the Hall itself will be found, as usual, the regular exhibitors of past years, and in addition a number of the larger machinery manufacturers who have never maintained operating exhibits at Greenville, have secured adequate spaces where they will display many new ideas and improvements.

There will be also the usual extensive exhibits of the main machinery people, with machines in operation, and one feature in connection with these exhibits will be that for the most part these major machinery concerns have made no exhibit since the Greenville show in 1922, which will allow them to present publicly for the first time a number of improvements and refinements that have been developed during the last two years.

A glance over the list of prospective exhibitors, hereto appended, will indicate a larger number of individual displays than ever before. "Standing Room Only" signs were long since hung out by the Greenville hotels, and the very efficient housing committee of Greenville has received applications for lodging in private homes. This commendable practice of placing delegates and exhibitors in the homes of Greenville was started at the 1920 show, and has been received with popular enthusiasm by many. It is not to be doubted that at the time of the Show itself, even with the crowded condition of Greenville's biennial overflow population, these workers will be able to provide lodging for those who come without any reservations.

Inquiry directed both to exhibitors and mills indicates a splendid attendance. Many mills, as in the past, will pursue the practice of sending their complete operating forces of superintendents, and overseers, either in bodies

or individually during the week.

According to custom, the semi-annual meeting of the Southern Textile Association will be held on Wednesday afternoon of Show Week. The program, being arranged by Oscar D. Grimes, vice-president of the Association, promises to present some features of pertinent interest.

To say that the entertainment will be typical of Greenville's hospitality is sufficient to indicate that everyone will enjoy the occasion. Golf links, country clubs, and other facilities will be placed at the disposal of exhibitors and visitors.

Show Week in Greenville has established itself as an institution in the southern textile industry, an event anticipated, and one affording a full week of pleasure and profit.

Tentative plans have been made by P. F. O'Neill, superintendent of the processing department of the Standard-Coosa-Thatcher Company at Chattanooga, Tennessee, and others, to organize a southern section of the American Association of Textile Chemists and Colorists. A group of these men located in the South, some of them already members of the association, have applied to the Central Council asking for a charter for this section; as the Council does not meet until September 26th in Boston, at the moment of writing these lines all plans are of course merely tentative. However, if the charter is granted, it is the intention of the promoters of this idea to have an organization dinner at the Imperial Hotel at Greenville, S. C., on Thursday of Show Week, which will be October 23rd and at the meeting which will follow, the official organization will be effected.

The following concerns have taken space for the Show:

American Scrubbing Equipment Co., Hannibal, Mo.
Atlanta Brush Co., Atlanta, Ga.
American Tool Works Co., Cincinnati, Ohio.
Ashworth Bros., Inc., Fall River, Mass.
Atkinson, Haserick & Co., Boston, Mass.
American Wool & Cotton Reporter, Boston, Mass.
Atkins, E. C. & Co., Indianapolis, Ind.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Armstrong Cork & Insulation Co., Pittsburgh, Pa.
Armour Soap Works, Chicago, Ill.
Aldrich Machine Works, Greenwood, S. C.
Blocker-Gregory Co., Providence, R. I.
Bahnson Co., The, Winston-Salem, N. C.
Bahan Textile Machinery Co., Greenville, S. C.
Butterworth & Sons Co., H. W., Philadelphia, Pa.
Barber Colman Company, Rockford, Ill.
Briggs-Shaffner Co., Winston Salem, N. C.
Barber-Asphalt Co., Philadelphia, Pa.
Brown Co., David, Lawrence, Mass.
Borne, Scrymser Company, New York City.
Baldwin Chain & Mfg. Co., Worcester, Mass.
Bond Company, Charles, Philadelphia, Pa.
COTTON, Grant Bldg., Atlanta.
Clipper Belt Lacer Co., Grand Rapids, Mich.
Carter, A. B., Gastonia, N. C.
Crompton & Knowles Loom Works, Worcester, Mass.
Crouse-Hinds Co., Syracuse, N. Y.
Chicago Bridge & Iron Works, Chicago, Ill.
Carolina Specialty Co., Charlotte, N. C.
Clark Electric Co., Jas., Jr., Louisville, Ky.
Curtis & Marble Machine Co., Worcester, Mass.
Crane Company, Chicago, Ill.
Cooper-Hewitt Electric Co., Hoboken, N. J.
Corn Products Sales Co., Greenville, S. C.
Carolina Power & Light Co., Raleigh, N. C.
Colson Company of Baltimore, Elyria, Ohio.
Cook, Taylor Co., Fall River, Mass.
Detroit Graphite Co., Detroit, Mich.
Draper Corporation, Hopedale, Mass.
Dodge Mfg. Co., Mishawaka, Ind.
Davis & Furber Machine Co., North Andover, Mass.
Eclipse Textile Devices, Inc., Elmira, N. Y.
Ebinger Sanitary Mfg. Co., Columbus, Ohio.
Economy Baler Co., Ann Arbor, Mich.
Everwear Mfg. Co., Springfield, Ohio.
Fafnir Bearing Co., New Britain, Conn.
Fisher Governor Co., Marshalltown, Ia.
Fales & Jenks Machine Co., Pawtucket, R. I.
Foster Machine Works, Westfield, Mass.
Ford Co., J. B., Wyandotte, Mich.
Fournier & LeMoine, Linwood, Mass.
Flexible Steel Lacing Co., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Fibre & Fabric, Cambridge, Mass.
Foots Mfg. Co., Fredericksburg, Va.
Grinnell Co., The., Providence, R. I.
Ga. Webbing & Tape Co., Columbus, Ga.
Greenville Belting Co., Greenville, S. C.
Gill Leather Co., Salem, Mass.
General Electric Co., Schenectady, N. Y.
Greenville Textile Supply Co., Greenville, S. C.
Graton & Knight Mfg. Co., Worcester, Mass.
Hyatt Roller Bearing Co., Harrison, N. J.
Haralson Sales Co., Birmingham, Ala.
Harris Oil Co., A. W., Providence, R. I.
Hopedale Mfg. Co., Milford, Mass.
Howard Brothers Mfg. Co., Worcester, Mass.
Huntington & Guerry, Greenville, S. C.
Hetherington & Sons, Inc., John, Boston, Mass.
Howes Publishing Co., New York City.
Haskins Co., R. G., Chicago, Ill.
Jordan Mfg. Co., Monticello, Ga.
Jenkins Brothers, New York City.
Jointless Fire Brick Co., Chicago, Ill.
Keever Starch Co., Columbus, Ohio.
Link-Belt Co., Chicago, Ill.
Lawrence Leather Co., A. C., Boston, Mass.
Lane & Bros., W. T., Poughkeepsie, N. Y.
Lestershire Spool & Mfg. Co., Johnson City, N. Y.
Lunkenheimer Co., Cincinnati, Ohio.
Livermore Co., H. F., Boston, Mass.
Lockwood, Greene & Co., Boston, Mass.
Lazenby Co., F. A., Baltimore, Md.
Morse Chain Co., Ithaca, N. Y.
Maloney Belting Co., Chicago, Ill.
Manufacturers Record, Baltimore, Md.
Mathieson Alkali Works, Inc., New York City.
Mason Machine Works, Taunton, Mass.
Manhattan Rubber Mfg. Co., Passaic, N. J.
Monroe Calculating Machine Co., Orange, N. J.
Manufacturing Equipt. & Eng. Co., Framingham, Mass
Mason Regulator Co., Boston, Mass.
National Aniline & Chemical Co., New York City.
N. Y. & N. J. Lubricant Co., New York City.
National Ring Traveler Co., Providence, R. I.
National Lamp Works, Cleveland, Ohio.
National Vulcanized Fiber Co., Wilmington, Del
Norma Co. of America, The, Long Island, N. Y.
Orr, Henry H., Greenville, S. C.
Oxweld Acetylene Co., New York City.
Oakley Chemical Co., New York City.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Park Mfg. Co., Charlotte, N. C.
Parks-Cramer Co., Fitchburg, Mass.
Philadelphia Belting Co., Philadelphia, Pa.
Powers Regulator Co., Chicago, Ill.
Poland Soap Works, Anniston, Ala.
Proctor & Gamble Dis. Co., Cincinnati, Ohio.
Peaslee-Gaulbert Co., Louisville, Ky.
R. I. Warp Stop Equipment Co., Pawtucket, R. I.
Reeves Pulley Co., Columbus, Ind.
Root Co., The, Bristol, Conn.
Rogers Fibre Co., Boston, Mass.
Ramsay Chain Co., Inc., Albany, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Seydel Chemical Co., New York City.
Sellers & Co., Wm., Philadelphia, Pa.
Sirrine & Co., J. E., Greenville, S. C.
Superheater Co., The, New York City.
Stein, Hall & Co., New York City.
Southern Textile Bulletin, Charlotte, N. C.
Shambow Shuttle Co., Woonsocket, R. I.
Stafford Co., The Readville, Mass.
Saco-Lowell Shops, Boston, Mass.
Slaghter-McCabe Co., Greenville, S. C.
Sherwin-Williams Co., Cleveland, Ohio.
Scott Company, H. L., Providence, R. I.
Sweeny, R. P., Greenville, S. C.
S K F Inlustries, Inc., New York City.
Sarco, Inc., New York City.
Steel Heddle Mfg. Co., Philadelphia, Pa.
Standard Oil Co., Charleston, S. C.
Southern Engineer, Atlanta, Ga.
Southern Wood Preserving Co., Atlanta, Ga.
Southern Franklin Process Co., Greenville, S. C.
Standard Fibre Co., Somerville, Mass.
Schieren, Charles A., New York City.
Stowe & Woodward, Newton Upper Falls, Mass.
Textiles, New York City.
Textile World, New York City.
Terrell Machine Co., Charlotte, N. C.
Textile Finishing Machinery Co., Providence, R. I.
Textile American, Boston, Mass.
Taylor Instrument Companies, Rochester, N. Y.
Transmission Ball Bearing Co., Buffalo, N. Y.
Taylor Co., Halsey W., Warren, Ohio.
Thermo Electric Instrument Co., Newark, N. J.
U. S. Gutta Percha Paint Co., Providence, R. I.
U. S. Ring Traveler Co., Providence, R. I.
U. S. Bobbin & Shuttle Co., Providence, R. I.
U. S. Rubber Co., New York City
Universal Winding Co., Boston, Mass.
Veeder Mfg. Co., Hartford, Conn.
Viscose Co., New York City.
Whitinsville Spinning Ring Co., Whitinsville, Mass.
Whitin Machine Works, Whitinsvlle, Mass.
Wilson Co., Greenville, S. C.
Woonsocket Machine & Press Co., Woonsocket, R. I.
Williams Co., The J. H., Millbury, Mass.
Westinghouse Lamp Co., New York City.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Woonsocket Napping Machinery Co., Woonsocket, R. I.
Walraven Co., The, Atlanta, Ga.
Washburn, New Bedford, Mass.

Following are descriptions of some exhibits to be made at the Greenville exposition, which were voluntarily sent in by the respective concerns:

(*Continued on page* 1281.)

Scientific Trends with a Textile Slant

A Problem in Work-Lighting.

The increased tendency toward so-called "daylight construction," which makes a factory virtually a sheltered piece of out-of-doors, involves several considerations which designers and plant executives would do well to consider at the outset.

The basic idea of such construction is an admirable instance of scientific reduction of operating costs through extension of the working period needing no artificial illumination. Brilliant midday, however, requires modification of the direct glare to which the edges of the rooms in such a building are subject and adequate provision has been made for this feature in scientifically designed outside awnings and adjustable interior light-diffusing screen-shades.

There still remains a problem to be dealt with,—that of establishing a balance between:

1. Light at edges of rooms and center, so that all, and especially particular work shall be lighted uniformly, and
2. the room, under the extreme change in daylight between a rainy day and a brilliant sunny one, or between high noon and early dusk.

The effect of introducing unmodified artificial light is a bad solution of this problem as it mixes badly in color with natural daylight. It possesses also the common evils of requiring an extraordinary degree of accommodation of the eyes to work (with resultant eyestrain and irritability) and marked falling off in productive efficiency.

The right solution of the problem lies in installation of properly disposed artificial daylight units of adequate capacity, so placed with regard to the layout of the workroom and the best effective working light intensity for each particular job, that these wide ranges of light-strength provided by nature can be compensated at will, gradually or suddenly, so as to merge the changes or failures of the natural light into an adequate artificial substitute each time the emergency or seasonal condition occurs.

A Scientific Executive Problem.

Why does the army send its officers to alternate periods with troops after staff and city detail? The rule was made long before the epoch of the "desk officer" so it can not be laid to chagrin at that spectacle.

Seriously, however, a psychological cure for certain evils existent in industrial relations lies in the employment of a similar method.

Those industrial plants which sought readjustment of the post-war "surplus foremen" problem gained the twofold benefit among their personnel of appreciation of a position a little above that of the average rank and file of labor as well as the advantage of a trade-basis foundation qualification for promotion.

Very few executives could fail to profit from study of at least one department of their "kingdom" apprentice-fashion, and no surer cure exists for the unreasonable side of ambition than to really assume the executive problem, in all its phases, for a brief period.

Once there was a plant that drew in a surplus of intelligent, youthful talent under the bid of "training them for management." As a few, only, of the number had valuable prior experience or were willing to serve the necessary probationary period that made them capable of handling any problem the list was soon greatly reduced. The remaining few became so much more capable than some of the former managers that they were soon drafted into special jobs or left the organization altogether for successful careers in other industries. Then, although a very large sum had been spent in the training of these men, the ownership went outside for a general manager rather than choose him from among them. This, briefly, is the history of a million dollars spent on accumulating experience in "teaching men the science of management."

Too long a tenure in one function is healthy neither for the occupant nor for the position to be served.

House Organs.

Comparison of the trade papers that come to our desk, with the prodigal expenditure of paper and printing noted on the average newstand, makes us glad to retire, frequently, within the seclusion of the former. In fact, many of the free-subscription "house organs" used to boost the products of large industry contain material which, in interest, illustration and makeup surpasses some textbooks.

This is being written in appreciation of the value and interest, the real educational and informative worth of these papers to us, and it is believed, to many another engineer.

You can find very little material as valuable in up-to-date current progress in any other source, and any mill-executive or engineer who does not get in touch with them is neglecting the extension feature of his education.

On subjects as diverse as lubrication, paint and ventilation they are competent, authoritative and inspiring.

* * * * *

Dying in Harness, or Creating a Reserve.

Have you ever seen a community where everyone lived in more or less the same status (and that a wretched one) all because no one of them had ever made the initial effort to build the means to obviate this wretchedness by saving himself the daily tasks upon which existence depends in such surroundings?

None of us care to be "gin hands" yet a burdensome share of such tasks fall to all who have not circumnavigated

Entry of the factor of "the rights of the public" has injected a new element into disputes between capital and labor, the outcome of which is not only not settled but of which no man can determine the extent.

Based upon the same principle, entrepreneurs of industry owe a responsibility to the public which finds expression in the situation they command to fix supply, prices and variety.

Not so long ago one of the chief organizers of a major textile group told the writer how busy he had been in Washington "working on the tariff" and that as a result "they had a tariff that was just what they wanted." It is hard to believe they wanted what was good for them if the present depression in that particular industry is any barometer of it.

Not only has the public rights in this matter but the folly of an unwisely selfish program like the one made is inevitably terminated in profitless periods like this one. The public is, of course, sadder but wiser—but that is not all. Ought not tariffs to be formulated by a representative (truly) of the public as well as the various industrial factors? If the public is a factor to be considered in restraint of labor it, likewise, has interest in the major policies of industry, or else we have a rule that does not work on both edges.

the condition upon which the necessity for them depends, viz.: creation, by extra effort, of conditions which overcome them.

Most of the great, lasting creations of the world have been made in reserve periods—of time, of effort, or of money or status. It is true that many of these have been dearly bought but none the less true that this interval or armistice with the pressure of daily routine was necessary before constructive thought could be evoked to generate the finished work.

The point is,—shall we string along just *meeting* the daily demand upon us or shall we be constantly one step ahead of it—a step accumulating toward our reserve supply upon which we shall draw to do that *great thing* by which we are going to be remembered.

Let's get away from this mediocrity, of which the world is all too full, and do "greater works" lest not only do the future slip away and leave bitterness and disappointment but that even present advantages vanish.

Suitable Dyes.

In making the decision to use, from the outset, only the highest and most applicable types of dyes, the southern textile industry has solved, at one initial stroke, a difficulty that has cost millions in other industries. Cooperative effort and expenditure made at this time to analyze and establish the proper suitable standards will not even entail insurance percentage of the cost of letting the problem drift along and take care of itself.

This is one outstanding reason, of many, for the cotton industry's participation in a general program for the improvement of textile materials. It is also a stroke of commercial genius when so handled.

Fastness Again.

In line with our earlier comments on the subject of opposing German dye aggression through closing up the gaps of standardization in the American products, the plan to start this by means of adopting fastness trade synonyms effects a defense at once striking, significant and permanent in result.

Backed by an adequate program of comparative rating against well-advertised, fixed, standard quantities, this is bound to be in fact, the forerunner of independence of the foreign product. It has long been known to the technician that American dyes meet the majority of current demands. Tie up this evidence with a rational program of education of the public and base this tie-up upon *description* of standards which the average man or woman can understand (quite a task) and we have, at one stroke, a permanent basis of style and fabric stabilization and have added one more unit to our national defense.

A Factor of Safety.

Not to be an alarmist, yet at the same time to take account of an existing fact, it would be well if the executive responsible for the welfare and contentment of his force would interest himself, particularly during the coming season, in providing facilities for gardens for as many of the employees' families as may be possible, and then to foster enthusiasm in the cultivation of these gardens. If this is not possible on mill property it can be accomplished, frequently, through some arrangement in nearby territory.

To an industry that is largely southern situated this may appear absurd, yet the fact that the South is, in general, a place "where something grows out of the ground every day in the year" is an advantage that should be *maintained* as one of the special advantages of the section. This is one of the best ways in which to do it.

Let's not look upon this as parallel to a war measure. Yet reflect that a period of unparalleled prosperity has made people wasteful of all their resources and that the natural wealth of the country, due to mismanagement and ignorance, has been consumed at an alarming rate in recent years. The only corrective measure is to re-create some of it.

You can not possibly replace, over night, the food that the unscrupulous shipper dumped into the river in order to hold out a small portion for an exhorbitant price. (The writer has seen this thing done.) You have to raise food—and it's a long job when you are hungry.

Crops failed in many farming sections this year—the total supply of available food will have to be stretched. There is no particular cause for uneasiness, but the tide should be turned in the right direction as much and as soon as possible.

Let's *keep* the South a place where nobody goes hungry—because "Pappy killed a pig, yesterday."

Reeves Pulley Company, Columbus, Indiana, manufacturer of "The Reeves" variable speed transmission, has designed and perfected a new steel link V-belt which represents a most important and practical improvement for a variable speed transmission device.

The construction of the new belt embodies a hardened steel link chain which is flexibly bound together by double frictionless rocking pins. It is a modification of a well known reliable steel chain belt, strengthened by cross steel pins to withstand the side pressure brought upon the belt when used between the cone discs on Reeves transmission.

Leather tips, which are cemented and riveted to steel tabs, are securely fastened to the belt sides at an angle conforming to the V-shaped groove of the transmission discs.

It is claimed that the new steel V-belt is practically unbreakable, and that due to its extreme flexibility, it will run smooth, even and true at all positions of the discs. It is also very quiet in its operation.

The steel belt is easily and quickly installed on a transmission—no tools being necessary. It is self-cleansing and requires only a few drops of good grade machine oil to insure proper lubrication. This belt may be specified on new transmissions, and can be applied to Reeves transmissions now in service.

"Another good thing about telling the truth is, you don't have to remember what you say."

A Device for Evening Card Sliver

There is described elsewhere in this issue an invention of W. W. Arnold, general superintendent of the Manchester Cotton Mills, Manchester, Ga., for improving the running of slasher sets. Mr. Arnold has also made an interesting and valuable contribution to the science of carding through the invention and development of a device for evening card sliver after stripping.

This matter of thin places in card sliver, and consequently in roving and yarn, has received so much attention in technical discussions by mill men that a description of this evener should be of interest. Usually, after a card is stripped, the custom is to allow from forty to seventy yards of sliver to run out on the floor in order to get the cylinder properly filled before piecing up. The amount of waste necessary to get a properly filled cylinder varies with the weight of sliver, weight of lap per yard and the production of the card, but about fifty yards is generally considered enough.

Now at a doffer speed of seven r.p.m. it takes three minutes to run off fifty yards of sliver, so that not only is waste made but production is lost as well. If, for example, the sliver weighs 70 grains, fifty yards will weigh half a pound, and if cards are stripped three times a day there will be one and one-half pounds of waste from each card, and nine minutes of time lost in bringing the sliver up to weight.

Furthermore, this method depends on the judgment and reliability of the operative. As every superintendent is constantly bearing down on the matter of waste, it is quite likely that strippers will lean toward a small amount of sliver waste rather than toward even sliver. No doubt many superintendents, in an effort to keep this item of waste down will allow piecing up before enough sliver has been allowed to run off.

In either case there will be thin places in the sliver, and in an ordinary carding mill where the doublings are no more than are absolutely necessary to get uniform yarn, these thin places usually cause trouble. In many cases, if they can be eliminated, the mill could run as well with less doublings, as an extra process may have been put in at some time to compensate for the light sliver.

Since obtaining even sliver is merely a matter of having the proper amount of cotton on the cylinder, Mr. Arnold has attacked the problem by arranging a mechanism that automatically puts enough cotton through to correctly load the cylinder before the doffer is started. In this way there

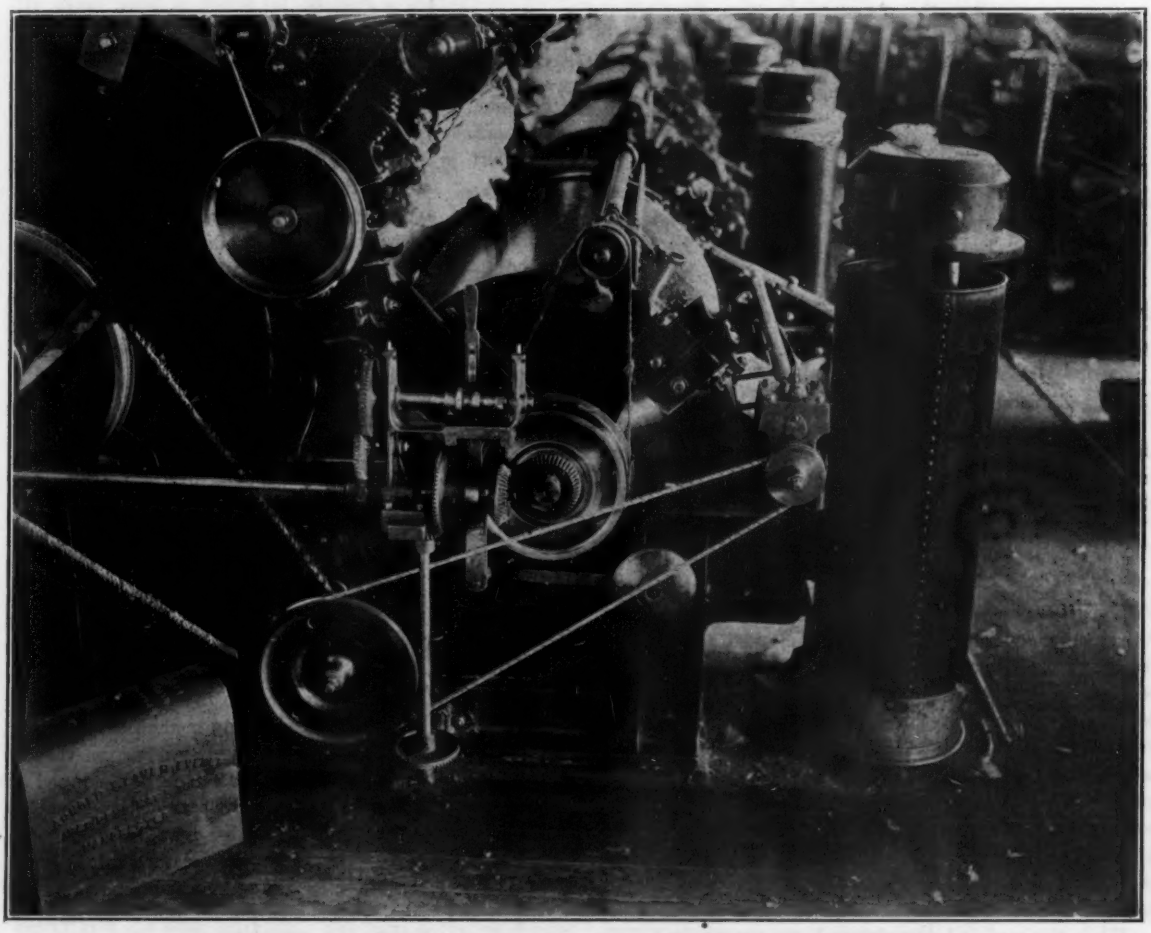

Fig. 1. A side view of a card at the Manchester Cotton Mills with the cover removed from the evener device.

is no waste to speak of; much time is saved, and the sliver is of correct weight as soon as the doffer starts.

Figure 1 shows a side view of the card with the cover off of the evening device. Figure 2 is a detailed drawing of the device showing more clearly the essential parts of it.

In Figure 1, the evener is shown in the position in which it is set for stripping the card. It will be noted that the bevel gear that drives the feed roll is disengaged from the gear on the doffer, thus stopping the feed roll for stripping the cylinder. The card is stripped in the usual manner, the evening device being ready to operate as soon as the stripping is complete.

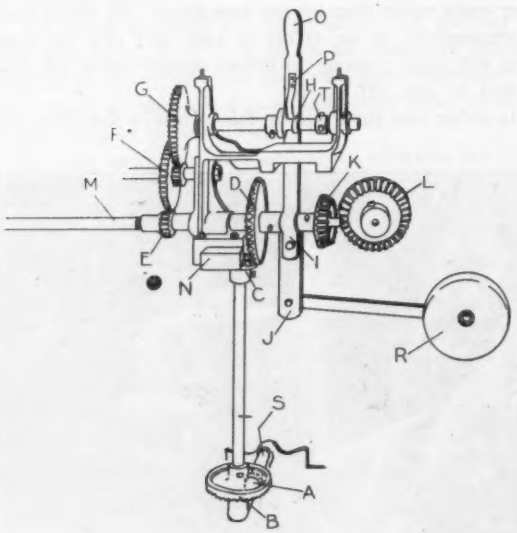

Fig. 2. A detail of the evener device showing how it operates.

The operation of the evener can easily be seen by referring to the illustration, and with the aid of a brief description.

A shaft *S* passes through the card underneath the doffer. On the opposite end of this shaft is mounted a small spur gear in such position that when the production gear is dropped out of mesh with the doffer gear it will engage with this small gear and turn the shaft *S*, which in turn operates the evener mechanism. The bevel gears *A*, *B*, *C* and *D* connect the shaft *S* to the side shaft *M* which drives the feed roll. When the lever *O* is pushed over to the "stripping position" as shown, it not only disengages the bevel gear *K* from the doffer gear *L*, but engages the bevel gears *D* and *C* and slides the small gear *E* into the change gear *F*, driving the gear *G* and sleeve *H*.

While the card is being stripped, the evener mechanism is inactive, but as soon as the stripping is finished, the stripper stops the doffer which allows the production gear to drive the feed roll through the evener. When the train of gears has turned the knock-off shaft *H* one complete revolution, a pawl attached to this shaft releases lever *O* by pressing against spring *P* allowing counter-weight *R* to move lever *O* back into its normal running position. Gear *D* is disconnected from *C*, and *E* from *F*. Gear *K* is meshed with doffer gear *L*, so that as soon as the doffer is started the feed roll will operate in the usual way.

The change gear *F* has the proper number of teeth to fill the cylinder with cotton. The feed roll may be driven at any desired speed while the cylinder is being loaded, although best results will be obtained by loading the cylinder at the regular speed of the feed roll, or slightly less. It is not advisable to jam the lap in too fast, as this may injure the clothing. When the lever *O* is thrown into the "running position" from the "stripping position" the doffer may be started at any time, putting the card on production. As it takes from thirty to forty seconds to load the cylinder the card is ready to go by the time the stripper has started stripping the next machine.

The sliver may be immediately pieced up and will be found to be full weight at once, provided the change gear is right.

This method of operation actually eliminates all waste, except that made while piecing up, and saves about two and one-half minutes of time, due to the fact that while the cylinder is loading, no cotton is being taken off, and it will therefore load much more quickly than if the doffer were running. This saving of time amounts to about one and one-quarter per cent of the total card room production.

The whole process is seen to be entirely automatic. Nothing is left to the judgment of the operative. The feed roll stops as soon as the desired amount of cotton is fed into the card, and the stripper has nothing to do but start up in the usual way. The only difference in the two methods is that instead of starting the doffer after stripping and leaving the card for a time to make waste, the doffer is not started when the stripper leaves the card, no waste is made, and the card will deliver full weight sliver as soon as it is started.

The device is as nearly fool and tinker-proof as can be made. When the pawl throws the lever back in its normal position, the spring *P* engages a slot in the collar *T* which prevents the gears *G* and *F* being moved, so that gear *G* will always make a full revolution before the pawl knocks off. The heavy weight *R*, operating about the stud *J* insures a prompt and positive return of the lever when it is released, so that the feed roll is instantly stopped and there is no possibility of putting in too much cotton. The lever is positively connected with the sleeve on the side shaft by the loose collar *I* which rides between the two gears *D* and *K*, both of which are fixed to the sleeve.

This evener may be used with any method of stripping. The operation described is in connection with the vacuum stripping system, in which the doffer is not stopped in stripping. Where a stripping roller is used, the lever *O* is set in a neutral position so that neither gear *D* nor gear *K* is in mesh. When the doffer is stopped and the shaft *S* turns, the evener will not operate. When the card is stripped, the stripper stops the doffer and pushes the lever into the "stripping position" as explained for the vacuum system.

Mr. Arnold has had this device in use for about two years, and has made a number of very interesting tests and experiments. He finds that his average breaking strength has increased five per cent since all cards have been thus equipped, and that much greater uniformity is obtained in finished yarn through elimination of thin places in the sliver. Weekly tests in a testing laboratory, under constant humidity and temperature conditions, indicate an average variation of about three per cent in breaking strength, week in and week out. This on a principal production of 14's single yarn.

The importance of keeping out light sliver is frequently underrated, as Mr. Arnold's tests seem to prove. Too many

superintendents seem to feel that the doublings are a cure-all for thin places, and in combed yarn mills this may be largely true, as an enormous number of doublings are thrown in by the different processes required in combing, but in the average medium or coarse mill, where a small number of doublings are put in, too much care can not be taken to keep out irregularities of any sort. Even on as heavy work as 14's single yarn, a yard of 70-grain sliver makes 117.6 yards of yarn. Since cards are all stripped in as rapid succession as possible, there will be a number of cans containing light sliver going to the drawing at once. The result is bound to be a certain amount of light roving and weak yarn.

Mr. Arnold claims that tests show as even yarn from one less process of drawing when using this evener on the cards. This opens up some important possibilities. If a coarse mill can cut out a process of drawing, there is a distinct saving in cost, and if a fine mill can get evener work with the same number of processes, there is a gain in quality. Of course, the heavy mill might wish to make the gain in evenness, or the light mill the saving of cost, but either way, the proposition has some very interesting points about it.

A patent has been granted to Mr. Arnold on this evener.

A Method of Determining the Quality of Carded Cotton Yarns

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A method for determining the quality of cotton yarns has come to be recognized by many cotton mill men as a growing necessity. In the case of warp yarn, opinion is fairly general that strength is the prime requisite, while in filling yarns evenness is the quality most to be desired. As a matter of fact, evenness is highly desirable in warp yarns as well as in filling yarns.

Take the case of two yarns where the strength is practically equal. At first hand, one would state that the yarns are equal. But when the evenness of the size and of the breaking strength is taken into consideration with the strength, a material difference is often found in the quality of the two yarns. It was the lack of an adequate measure of this difference in quality that led to the method that has been devised.

Considerable difficulty was encountered in determining the factor of evenness. However, an accurate measure of evenness is available through the determination of the percentage of average deviation and of extreme variation of both the size and the breaking strength. These determinations are made as follows:

The average break and size are first obtained in the usual manner.

The deviation is next obtained. This is found by subtracting the average from all figures that are higher than the average, and subtracting all figures that are lower than the average from the average. These results when added together give the total deviation. The total deviation divided by the number of tests made gives the average deviation. The average deviation multiplied by 100 and divided by the average break (or size) gives the percentage of average deviation.

The percentage of extreme variation is found by subtracting the lowest break (or size) from the highest break (or size) of the test, multiplying this difference by 100 and dividing this result by the average break (or size).

The break per number is found by multiplying the actual average break by the actual average size and dividing by the number.

The method used in determining the quality of yarns is based upon the use of constant numbers obtained from the averages of a large number of tests of mill yarns which were broken and sized under an automatically controlled temperature of 70 degrees F. and a relative humidity of 65 per cent.

The constants for evenness were found to be as follows:

	Warp	Filling
Percentage of deviation of size	3	3
Percentage of extreme variation of size	14	14
Percentage of deviation of breaking strength	5	6.5
Percentage of extreme variation of breaking strength	24	31

The constant for strength of warp yarn was found to approximate the old Draper standard. The constant for strength of filling yarn approximates Draper's "NEW BREAKING WEIGHT OF SOFT TWIST YARN."

Dividing each of these constants by the corresponding factor of any yarn will give a measure of the superiority or inferiority of that factor. Experience shows that "E," the index of evenness, can be obtained only from an average of the individual ratios.

The foregoing points are illustrated in the following equations:

WARP.

$$\frac{3}{\%\text{ Deviation of Size}} = A$$

$$\frac{14}{\%\text{ Extreme Variation of Size}} = B$$

$$\frac{5}{\%\text{ Deviation of Breaking Strength}} = C$$

$$\frac{24}{\%\text{ Extreme Variation of Breaking Strength}} = D$$

$$\frac{A + B + C + D}{4} = E, \text{ the index of evenness.}$$

$$\frac{\text{Breaking Strength}}{\text{Old Draper Standard for Warp Yarn}} = S, \text{ the index of strength.}$$

FILLING.

$$\frac{3}{\%\text{ Deviation of Size}} = A$$

$$\frac{14}{\%\text{ Extreme Variation of Size}} = B$$

$$\frac{6.5}{\%\text{ Deviation of Breaking Strength}} = C$$

$$\frac{31}{\%\text{ Extreme Variation of Breaking Strength}} = D$$

$$\frac{A + B + C + D}{4} = E, \text{ the index of evenness.}$$

$$\frac{\text{Breaking Strength}}{\text{Draper's "New Breaking Weight of Soft Twist Yarn}} = S,$$

the index of strength.

The following equations cover all requirements when judging the quality of warp or filling yarn. *The proper equation to use will be determined by the purpose for which the yarn is spun.*

$$(1)\quad Q = \frac{4S + E}{5}$$

$$(2)\quad Q = \frac{S + E}{2}$$

$$(3)\quad Q = \frac{S + 4E}{5}$$

The question naturally arises why a relative weight of four is given to "S" in equation (1) and to "E" in equation (3). Four is an entirely arbitrary number. Increasing the relative weight to greater than four does not usually affect the quality of the yarn. Decreasing the relative weight to less than four makes the quality conform too closely to equation (2).

Ordinarily equation (1) would be used for warp yarns where strength is the important factor. Equation (3) would be used for filling or soft twist yarns because evenness is more essential than strength. Equation (2) is applicable to either warp or filling yarn when strength and evenness are of equal importance.

When the result "Q" equals 1.000, the yarn is of average or standard quality. If a yarn has a quality "Q" greater than 1.000, it is superior in some respect to the average yarn. If a yarn has a quality "Q" less than 1.000, it is inferior in some respect to the average yarn. By subtracting 1.000 from the result "Q" or the result "Q" from 1.000 and multiplying by 100, the result will be the percentage that that yarn is either superior or inferior to the average.

Warp.

The application of formulas (1) and (2) is illustrated by the results of tests made on 28s carded warp yarns, of equal strength, submitted by two mills. For convenience, these mills are designated Mill A and Mill B.

MILL A.

28s Carded Warp Yarn.

	Break per Skein (Lbs.)	Avg. Break (Lbs.)	Deviat'n of Break	Size	Average Size	Deviat'n of Size
1	53.5	50.8	2.7	28.00	28.42	.42
2	53.0	50.8	2.2	29.25	28.42	.83
3	48.0	50.8	2.8	26.75*	28.42	1.67
4	52.5	50.8	1.7	28.50	28.42	.08
5	50.5	50.8	.3	28.50	28.42	.08
6	50.0	50.8	.8	28.50	28.42	.08
7	50.5	50.8	.3	27.50	28.42	.92
8	53.0	50.8	2.2	27.75	28.42	.67
9	51.0	50.8	.2	28.25	28.42	.17
10	51.5	50.8	.7	28.25	28.42	.17
11	50.0	50.8	.8	28.25	28.42	.17
12	51.5	50.8	.7	29.50	28.42	1.08
13	53.0	50.8	2.2	28.75	28.42	.33
14	50.0	50.8	.8	28.25	28.42	.17
15	50.0	50.8	.8	27.75	28.42	.67
16	47.0	50.8	3.8	30.00*	28.42	1.58
17	51.0	50.8	.2	29.50	28.42	1.08
18	54.0*	50.8	3.2	27.25	28.42	1.17
19	53.5	50.8	2.7	29.75	28.42	1.33
20	49.5	50.8	1.3	27.50	28.42	.92
21	48.0	50.8	2.8	29.50	28.42	1.08
22	53.0	50.8	2.2	27.50	28.42	.92
23	46.5*	50.8	4.3	29.25	28.42	.83
24	49.0	50.8	1.8	28.00	28.42	.42
Total	1219.5		41.5	682.00		16.84

Avg. 50.8. $\frac{41.5}{24} = 1.73$, Avg. 28.42. $\frac{16.84}{24} = .702$

% Deviation $\frac{1.73}{50.8} \times 100 = 3.41\%$ $\frac{.702}{28.42} \times 100 = 2.47\%$

% Extreme variation $\frac{7.5}{50.8} \times 100 = 14.76\%$ $\frac{3.25}{28.42} \times 100 = 11.43\%$

Break per 28s $\frac{50.8 \times 28.42}{28.00} = 51.5$ pounds.

* Indicates the extremes.

MILL B.

28s Carded Warp Yarn.

	Break per Skein (Lbs.)	Avg. Break (Lbs.)	Deviat'n of Break	Size	Average Size	Deviat'n of Size
1	50.0	51.1	1.1	28.00	28.31	.31
2	52.0	51.1	.9	29.00	28.31	.69
3	54.5	51.1	3.4	27.50	28.31	.81
4	45.5	51.1	5.6	29.75	28.31	1.44
5	48.0	51.1	3.1	30.00	28.31	1.69
6	51.0	51.1	.1	27.75	28.31	.56
7	56.5*	51.1	5.4	27.25	28.31	1.06
8	49.0	51.1	2.1	29.25	28.31	.94
9	52.0	51.1	.9	29.75	28.31	1.44
10	47.5	51.1	3.6	27.50	28.31	.81
11	55.0	51.1	3.9	27.25	28.31	1.06
12	56.5	51.1	5.4	27.00	28.31	1.31
13	53.0	51.1	1.9	27.50	28.31	.81
14	54.0	51.1	2.9	26.00*	28.31	2.31
15	54.0	51.1	2.9	28.50	28.31	.19
16	54.0	51.1	2.9	26.50	28.31	1.81
17	43.5*	51.1	7.6	32.00*	28.31	3.69
18	51.5	51.1	.4	28.00	28.31	.31
19	55.5	51.1	4.4	27.50	28.31	.81
20	44.0	51.1	7.1	30.00	28.31	1.69
21	51.5	51.1	.4	28.00	28.31	.31
22	53.0	51.1	1.9	27.75	28.31	.56
23	44.5	51.1	6.6	29.25	28.31	.94
24	51.0	51.1	.1	28.50	28.31	.19
Total	1227.0		74.6	679.50		25.74

Avg. 51.1. $\frac{74.6}{24} = 3.11$ Avg. 28.31. $\frac{25.74}{24} = 1.073$

% Deviation $\frac{3.11}{51.1} \times 100 = 6.08\%$ $\frac{1.073}{28.31} \times 100 = 3.79\%$

% Extreme variation $\frac{13.0}{51.1} \times 100 = 25.44\%$ $\frac{6.00}{28.31} \times 100 = 21.19\%$

* Indicates the extremes.

$$\text{Break per 28s} \frac{51.1 \times 28.31}{28.00} = 51.6 \text{ pounds.}$$

MILL A.

$$A = \frac{3}{2.47} = 1.215$$

$$B = \frac{14}{11.43} = 1.225$$

$$C = \frac{5}{3.41} = 1.466$$

$$D = \frac{24}{14.76} = 1.626$$

$$E = \frac{A+B+C+D}{4} = \frac{1.215+1.225+1.466+1.626}{4} = 1.383$$

$$S = \frac{\text{Breaking Strength}}{\text{Old Draper Standard for 28s Carded Warp Yarn}} = \frac{51.5}{61.3} = .840$$

$$\text{Formula (1) } Q = \frac{4S+E}{5} = \frac{(4 \times .840)+1.383}{5} = .949$$

$$(1.000 - .949) \times 100 = -5.1 \text{ per cent.}$$

$$\text{Formula (2) } Q = \frac{S+E}{2} = \frac{.840+1.383}{2} = 1.112$$

$$(1.112 - 1.000) \times 100 = +11.2 \text{ per cent.}$$

MILL B.

$$A = \frac{3}{3.79} = .792$$

$$B = \frac{14}{21.19} = .661$$

$$C = \frac{5}{6.08} = .822$$

$$D = \frac{24}{25.44} = .943$$

$$E = \frac{A+B+C+D}{4} = \frac{.792+.661+.822+.943}{4} = .805$$

$$S = \frac{\text{Breaking Strength}}{\text{Old Draper Standard for 28s Carded Warp Yarn}} = \frac{51.6}{61.3} = .842$$

$$\text{Formula (1) } Q = \frac{4S+E}{5} = \frac{(4 \times .842)+.805}{5} = .835$$

$$(1.000 - .835) \times 100 = -16.5 \text{ per cent.}$$

$$\text{Formula (2) } Q = \frac{S+E}{2} = \frac{.842+.805}{2} = .824$$

$$(1.000 - .824) \times 100 = -17.6 \text{ per cent.}$$

The results of the determination of the quality of the warp yarn from Mill A and Mill B are as follows:

	Mill A	Mill B	Difference in Quality
By Formula (1).....	—5.1%	—16.5%	11.4%
By Formula (2).....	+11.2%	—17.6%	28.8%

Thus if strength is required, Mill A produced a yarn that was 11.4 per cent better in quality than that produced by Mill B and 28.8 per cent better if both strength and evenness are required.

Filling.

The application of Formulas (2) and (3) is illustrated by the results of tests on 40s carded filling yarn from two mills. For convenience, these mills have been designated Mill C and Mill D.

The method of determining the averages, percentages of average deviation, percentages of extreme variation, and the break per number is the same as for warp yarns.

MILL C.

40s Carded Filling Yarn.

	Break per Skein (Lbs.)	Avg. Break (Lbs.)	Deviat'n of Break	Size	Average Size	Deviat'n of Size
1	35.0	34.9	.1	37.25	37.30	.05
2	34.0	34.9	.9	37.25	37.30	.05
3	34.0	34.9	.9	37.50	37.30	.20
4	31.0*	34.9	3.9	40.50*	37.30	3.20
5	34.0	34.9	.9	37.50	37.30	.20
6	36.5	34.9	1.6	37.75	37.30	.45
7	38.5	34.9	3.6	37.25	37.30	.05
8	36.0	34.9	1.1	36.75	37.30	.55
9	34.5	34.9	.4	37.50	37.30	.20
10	31.5	34.9	3.4	38.75	37.30	1.45
11	41.0*	34.9	6.1	35.50	37.30	1.80
12	38.0	34.9	3.1	36.25	37.30	1.05
13	35.0	34.9	.1	35.50	37.30	1.80
14	34.0	34.9	.9	36.75	37.30	.55
15	37.0	34.9	2.1	35.25	37.30	2.05
16	32.[illegible]	34.9	2.9	38.50	37.30	1.20
17	33.0	34.9	1.9	39.25	37.30	1.95
18	34.0	34.9	.9	36.75	37.30	.55
19	38.5	34.9	3.6	35.75	37.30	1.55
20	32.5	34.9	2.4	38.75	37.30	1.45
21	32.0	34.9	2.9	38.25	37.30	.95
22	34.0	34.9	.9	38.00	37.30	.70
23	35.5	34.9	.6	35.00*	37.30	2.30
24	35.0	34.9	.1	37.75	37.30	.45
Total	836.5		45.3	895.25		24.75

Avg. 34.9. $\frac{45.3}{24} = 1.89$ Avg. 37.30. $\frac{24.75}{24} = 1.031$

% Deviation $\frac{1.89}{34.9} \times 100 = 5.41\%$ $\frac{1.031}{37.30} \times 100 = 2.76\%$

% Extreme variation $\frac{10.0}{34.9} \times 100 = 28.65\%$ $\frac{5.50}{37.30} \times 100 = 14.74\%$

$$\text{Break per 40s} \frac{34.9 \times 37.30}{40} = 32.5 \text{ pounds.}$$

* Indicates the extremes.

MILL D.

40s Carded Filling Yarn.

	Break per Skein (Lbs.)	Avg. Break (Lbs.)	Deviat'n of Break	Size	Average Size	Deviat'n of Size
1	40.0	37.3	2.7	37.75	39.92	1.17
2	39.5	37.3	2.2	39.50	39.92	.42
3	35.0	37.3	2.3	40.75	39.92	.83
4	40.0	37.3	2.7	38.25	39.92	1.67
5	40.5	37.3	3.2	40.00	39.92	.08
6	36.0	37.3	1.3	40.25	39.92	.33
7	38.0	37.3	.7	39.00	39.92	.92
8	38.0	37.3	.7	39.25	39.92	.67
9	40.5	37.3	3.2	39.00	39.92	.92
10	35.0	37.3	2.3	40.50	39.92	.58
11	41.5*	37.3	4.2	38.00*	39.92	1.92
12	41.5	37.3	4.2	38.50	39.92	1.42
13	40.5	37.3	3.2	39.00	38.82	.92
14	39.0	37.3	1.7	38.50	39.92	1.42

15	40.0	37.3	2.7	38.25	39.92	1.67
16	38.0	37.3	.7	39.75	39.92	.17
17	38.5	37.3	1.2	41.75	39.92	1.83
18	28.0*	37.3	9.3	44.25*	39.92	4.33
19	41.0	37.3	3.7	38.75	39.92	1.17
20	33.5	37.3	3.8	41.00	39.92	1.08
21	34.5	37.3	2.8	39.75	39.92	.17
22	29.0	37.3	8.3	43.75	39.92	3.83
23	33.0	37.3	4.3	40.25	39.92	.33
24	34.5	37.3	2.8	41.25	39.92	1.33
Total	895.0		74.2	958.00		29.18

Avg. 37.3. $\frac{74.2}{24} = 3.09$ Avg. 39.92. $\frac{29.18}{24} = 1.216$

% Deviation $\frac{3.09}{37.3} \times 100 = 8.29\%$ $\frac{1.216}{39.92} \times 100 = 3.05\%$

% Extreme variation $\frac{13.5}{37.3} \times 100 = 36.19\%$ $\frac{6.25}{39.92} \times 100 = 15.66\%$

Break per 40s $\frac{37.3 \times 39.92}{40} = 37.2$ pounds.

* Indicates the extremes.

MILL C.

$$A = \frac{3}{2.76} = 1.087$$

$$B = \frac{14}{14.74} = .950$$

$$C = \frac{6.5}{5.41} = 1.201$$

$$D = \frac{31}{28.65} = 1.082$$

$$E = \frac{A+B+C+D}{4} = \frac{1.087+.950+1.201+1.080}{4} = 1.080$$

$$S = \frac{\text{Breaking Strength}}{\text{Draper's "New Breaking Weight of Soft Twist Yarn"}} = \frac{32.5}{34} = .956$$

$$\text{Formula (3) } Q = \frac{S+4E}{5} = \frac{.956+(4\times1.080)}{5} = 1.055$$

$(1.055 - 1.000) \times 100 = +5.5$ per cent.

$$\text{Formula (2) } Q = \frac{S+E}{2} = \frac{.956+1.080}{2} = 1.018$$

$(1.018 - 1.000) \times 100 = +1.8$ per cent.

MILL D.

$$A = \frac{3}{3.05} = .983$$

$$B = \frac{14}{15.66} = .894$$

$$C = \frac{6.5}{8.29} = .784$$

$$D = \frac{31}{36.19} = .856$$

$$E = \frac{A+B+C+D}{4} = \frac{.983+.894+.784+.856}{4} = .879$$

$$S = \frac{\text{Breaking Strength}}{\text{Draper's "New Breaking Weight of Soft Twist Yarn"}} = \frac{37.3}{34} = 1.094$$

$$\text{Formula (3) } Q = \frac{S+4E}{5} = \frac{1.094+(4\times.879)}{5} = .922$$

$(1.000 - .922) \times 100 = -7.8$ per cent.

$$\text{Formula (2) } Q = \frac{S+2}{2} = \frac{1.094+.879}{2} = .987$$

$(1.000 - .987) \times 100 = -1.3$ per cent.

The results of the determination of the quality of the filling yarn from Mill C and Mill D are as follows:

	Mill C	Mill D	Difference in Quality
By Formula (3).....	+5.5%	−7.8%	13.3%
By Formula (2).....	+1.8%	−1.3%	3.1%

Thus if evenness is required, Mill C produced yarn that was 13.3 per cent better in quality than that produced by Mill D, and 3.1 per cent better if both evenness and strength are required.

Following the recent conference on universal standards for American cotton, held in London between representatives of the United States Department of Agriculture, Washington, and the European signatories to the original agreement, when the Department of Agriculture submitted a supplemental agreement to facilitate the working of the original agreement, the following six of the nine European signatories to the agreement have made notification of their acceptance of the same, namely: The Manchester Cotton Association, Syndicat Du Commerce Des Cotons Du Havre, Bremer Baumwollborse, Associazione Cotoniera Italiana, Centro Algodonero De Barcelona, and Vereeniging Voor Den Katoenhandel te Rotterdam. The Manchester Cotton Association members include not only the cotton merchants and brokers, but spinners controlling over half the spindles in Great Britain, namely, 30,000,000, so that the last-named, through that Association, have a direct voice in the matter.

E. I. du Pont de Nemours & Co. announce Pontacyl Light Red BL, a new color, as an acid color of bright bluish red shade possessing exceptional fastness to light; used either as a self-shade for pinks, reds and salmon or more frequently in combination with suitable yellows and blues for fashion and mode shades. It is said to be especially suitable for weaving and sweater yarns and also as a red element on carpet yarns where exceptional light resistance is required; cotton and artificial silk effects are left unstained.

American Blower Company, Detroit, Mich., have just issued a booklet on the American H. S. fan, their latest development, which has a number of interesting features. In addition to the fan description are a number of original specification and capacity tables relating to fans that should be valuable. The name of the booklet is Bulletin 1103.

Textile Operating Executives of Georgia Meet at Atlanta Biltmore

The semi-annual meeting of the Textile Operating Executives of Georgia, devoted to slashing and weaving discussion, was held in Atlanta on September 16th, at the Atlanta Biltmore Hotel. A larger crowd than usual, together with a good discussion, made the occasion a success.

William W. Arnold, Jr., of Manchester, Ga., who is general superintendent of the Manchester (Ga.) Cotton Mills, the Milstead (Ga.) Mfg. Company, and the Unity Cotton Mills of LaGrange, was elected general chairman to succeed Carl P. Thompson, superintendent of The Trion (Ga.) Company, whose term expired. Louis L. Jones, secretary and superintendent of the Canton (Ga.) Cotton Mills, was made vice general chairman succeeding George W. Hamilton, vice-president and superintendent of the Crown Cotton Mills, Dalton, Ga., Henry D. Martin, superintendent of the Griffin (Ga.) Mfg. Company, was placed on the executive committee to succeed H. O. Davidson, vice-president of the Eagle & Phenix Mills, Columbus, Ga., whose term expired with this meeting. Robert W. Philip, associate editor of COTTON, Atlanta, was re-engaged as secretary-treasurer.

General Chairman Thompson presided at the meetings, with Frank K. Petrea, superintendent of the Swift Mfg. Company, Columbus, Ga., in charge of the slashing discussion, and Hal Riviere, superintendent of the Eagle & Phenix Mills, Columbus, in charge of the weaving discussion in the afternoon. Oscar D. Grimes, vice-president and general manager of The Athens (Ga.) Mfg. Company, acted as toastmaster at the "Dutch" luncheon.

The meeting was opened on Tuesday morning at 10 o'clock by General Chairman Thompson, who expressed appreciation at the attendance of members, visitors and guests. This followed the invocation by Mr. Jones, of Canton. Next presented was Dr. Carter Helm Jones, pastor of the Second Baptist Church of Atlanta, who spoke on the subject of

"Personality."

"I have come to talk to you a little while today about personality," said Dr. Jones. "I would not attempt to discuss this with any great length or breadth or depth. Personality is one of the most wonderful things in the world, and like all wonderful things, it is difficult to define. Have you ever stopped to think how difficult a thing definition is? I believe definition is the acme of culture; when a man is able to define a thing he knows it, absolutely.

"But we know what personality is, even if we are not able to define it. We know that personality is the sum total of the I and the You; all that we appear to be physically, all that we are in expression, all that loves and hates and fears and thinks and dreams and smiles and frowns and laughs and weeps—this all makes up that marvelous I. That is the reason I believe in immortality; it is the glorious persistence of personality.

"I like some times to begin at the beginning, and think of personality as the unit in this great world in which we live. George MacDonald has very beautifully put it in a little poem. I think of it so often when I stand at the door of the very holy of holies of life. I have gone in so often when the room is more than darkened and my eyes are used to the twilight, and I see upon the pillow the face purified by the seven-heated furnace of suffering, yet with a light on it that never was on sea or land. I have followed the wistful smile on that Madonna face and have seen the opening bud that God has planted in the garden of life. Then I think of those words of George MacDonald:

"'Where did you come from, baby dear?
Out of thought everywhere into the here.
Where did you get your eyes so blue?
Out of the sky as I came through.
Where did you get that curve of the ear?
God spoke and it came out to hear.
How did all this come to be you?
God thought about me and so I grew.
How did you come to us, you dear?
God thought about you, and so I am here.'

"Is that not it? Every baby is an incarnate thought of God. Every baby that slips down into a mother's arms slips down from the radiant altar of God's love. It is a great thought, and it is spoken in that marvelous sentence by the Beloved One, "In the beginning was the Word, and the Word was God, and the Word became flesh and dwelt among us." No wonder that Democracy is at last catching the spirit of Jesus, the founder of Spiritual Kingdom. No wonder that the Spiritual Kingdom is breaking down the old feudal systems, and finding, as Bobbie Burns loved to sing, 'A man's a man for a' that.' It is the discovery of the individual. That's what the Kaiser and his war lords forgot—that the individual was coming to the front. That is why Democracy must always be conquering because it recognizes the worth of personality. It is a great thing to know that I am because God is, and I am part of God's great plan, and I am a part of God's great world, and God has committed to me something that no other man can do, and therefore God expects great things of me.

"I say some think that ambition is a revelation of that thought—the awakening soul through education and contact with personality finds itself. I am thinking of you men today, and that is the reason why I chose as ambitious a subject as this—I am thinking of you as men who deal with your fellowman. Do you know, the finest thing in the

Left to Right—L. L. Jones, superintendent, Canton (Ga.) Cotton Mills, elceted vice general chairman; Hal Riviere, superintendent, Eagle & Phenix Mills, Columbus, Ga., weaving chairman; Robert W. Philip, associate editor COTTON, Atlanta, secretary; and Carl P. Thompson, superintendent, The Trion (Ga.) Co., retiring general chairman.

world is the impact of personality upon personality. The soul that tries to live by itself misses it. That is the reason God has put the solidarity into families. That is the reason that society is woven together into the fabric of interrelated personalities; you touch personality and personality touches you."

Dr. Jones said then that in the present specialized age the personality of man is becoming submerged by the advent of automatic machinery and systematized manufacture. He told of a visit to a sewing machine factory, where one man said to him, "Yes, we are making great machines. This is a great factory, but you know there is one sad thing. When I came to this place nearly all of us master mechanics could build a sewing machine. We knew how. Now there are only a few of us who know anything about the sewing machine except the part we do. Look at that man there; he spends six days of every week punching a hole."

"The tragedy of it," said Dr. Jones, "is that we subsidize our own opinions and make machines of ourselves. The great thing to us is that personality implies personality. My personality implies yours, and yours mine, and the great job that you and I have in this world, is to know other folk. Some great philosopher once said that utter knowledge means utter love. I think he is right. Where we know, we understand, and understanding bids us put ourselves in the other man's place; then we love, and then we sympathize, and then we cooperate.

"In the old days about 75 years ago in Portsmouth, Virginia, when it was all grown up with forest, save a very few villages, a very valuable horse was lost. That was a serious thing in those days. After looking and looking and calling in all the neighbors the horse had not been found. About three days afterwards a big, lanky lad supposed to be about half-witted came in, leading the horse, and they did not know he had been looking for it. 'Why,' they said, 'where did you find him'? He said, 'Well, after you fellers had been looking, and hadn't found him, I went to whur the horse was last seen at, and I stood there, and I says to myself, "If I was a horse, whur would I go"? And I went thar, and thar the horse was, and he always is.' Ah, that is it—the art of putting yourself in the other fellow's place. Oh, yes, I will admit that sometimes that horse in my story is a mule, and it is a little difficult to carry out under those circumstances.

"I will admit that there are men that are not like horses, in fact more like mules, but that makes the job all the more beautiful. True knowledge, sympathy, comradeship, that touch of humanity, the human touch, is what counts for results in our lives. It is a great thing to have the finest machines that can be made; but men, you know as I know, and I have been dealing for forty years with men in every walk of life, that we cannot get past the human heart and the human touch, and manhood is at the peak of all machinery, and manhood must be in touch with all machinery. Indeed manhood must be on top of all machinery. Men are not machines. They have brains; they have hearts; they have feelings; and, as I said a moment ago, they vary in their ambitions. You have heard the story of the men who were busily engaged in the construction of a great piece of architecture. One man was asked 'What are you doing'? He replied, 'I am digging a ditch, digging a hole.' Another was asked what he was doing and he said, 'I am sawing some lumber.' Another was asked what he was doing. He was a young man, and as he spoke he looked up from his work with a light in his eyes, and he replied, 'What am I doing? I am helping to build a cathedral for the worship of God.' A great difference.

"One of the greatest sentences ever uttered was near the first of that old Book that your mother once taught you to love, and it is this, 'Let us make man; let us make man.' The creation of other things men might attempt, but it took God to make man. You may be makers of manhood, whether you are an employer or an employee, and every man is an employee. I know I am, and I know you are employed by somebody, by some person, some corporation, or by society, or by the world, or by God. Every one of us knows that in our relationships we are helping to make men. If we are going to improve a product, we have got to improve the men that make it. Some one said some time ago that you couldn't have a straight horse race as long as you had a crooked human race. That's pretty true, too. As one who has studied humanity, I have watched the growth of motives and the growth of minds, and impulses; I have watched boys and girls; I have seen the development and watched the impulses in the school and elsewhere, and I have tried to help direct and draw them out. Sometimes in after years I have found them climbing to heights, that

my feet have never trod, singing songs my poor voice could never sing, doing duties I never had the skill to perform, and saying words that I have only dreamed could be spoken. So it is and will be with you. Oh, men, it would be a great thing not only to increase your product, and increase your salaries, and handle your product intelligently, but to put yourselves in touch with the men and women and boys and girls in your employ, and realize that fine comradeship with labor that they may in the future in this great industry be makers of worth and value. It is a great thing.

"Rudyard Kipling, one of my favorite short story writers, has written a beautiful little poem, which I will quote to you as I close:

"'When earth's last picture is painted
And the tubes are twisted and dried;
When the oldest colors have faded
And the youngest critic has died;
We shall rest, and, faith, we shall need it,
Lie down for an aeon or two,
Till the Master of all good workmen
Shall set us to work anew.

"'Then only the Master shall praise us,
And only the Master shall blame.
And no one shall work for money,
And no one shall work for fame;
But each for the joy of the working
And each in his separate star
Shall paint the thing as he sees it
For the God of things as they are.'"

Slashing Discussion.

After Dr. Jones' address, the meeting went into the slashing discussion, led by Mr. Petrea. The first question asked was, "In running three sets of the same number of ends and the same yarn, knowing that the size is mixed exactly the same and boiled the same, what causes these sets to invariably show a difference in the percentage of size on the yarn?"

John H. Howarth, assistant superintendent at the Lanett Mill, West Point, who originally asked the question, stated that "I have been trying to put on a certain percentage of size on a certain class of work. I have been trying to put on eight per cent, which is about four or four and a half per cent on the cloth as it left the loom. I didn't only run three sets, I ran more than that, and under the same conditions, as far as possible, for I watched everything and had some textile students watch it for me, with everything the same, and I know that the charts that come from the recording thermometers on the size control were all right, yet the size on the yarn on the different sets would vary one and a half per cent. One went down about as low as seven per cent and I have had them up to eight and a half.

"It struck me at the time that I couldn't understand it and so I asked the question; why can't I get the same percentage of size on all my warp yarn?"

Called upon by the chairman, Mr. Martin, of Griffin, said that, "I don't know whether I may be able to throw any light on the subject, but to start the ball rolling I will make a few suggestions. The reason why it is not possible to have exactly the same percentage of size set after set is for the same reason that it is not possible to have the same number of yarn exactly the same size all the time, and for the same reason that it is impossible to make a perfect piece of cloth. It is the same way with the size. You may mix it the same, and you may think that you have the size the same, but it isn't.

"The reasons I would give for variation from set to set are that the temperature of the size may vary, the viscosity of the size may vary slightly, and the speed of the machine varies. The temperature of the atmosphere in the room may vary. These things are constantly varying. Sometimes they vary in favor of more size and then in favor of less size.

"There is one more reason—you are not using the same cotton in one set that you are in the second and third, and what varies more than cotton. Hardly two handfuls of cotton are alike. Therefore I say that the reason size varies is varying temperature of the size, varying speed of the machine, variation in the yarn, and variation in the cotton."

John F. Long, superintendent, Beaver-Lois Mills, Douglasville, asked Mr. Howarth if he was certain that his warp yarn had the same twist in it?

"Yes, sir," was the answer, "absolutely. As far as any man could know. We never changed the gears. Now I said that my size varied one and a half percent. I mean one and a half per cent of the percentage that I got, so that means a whole lot. I am putting in so many pounds of material, and the same number of pounds every time. It

must go somewhere. The shedding is about the same, making the loss about the same, so it must go somewhere. I put it in there, and still, when it is delivered in front of the slasher it is either just a little over or under."

Mr. Heymer, of Columbus, asked if there was variation in the humidity. Whether the conditions under which the yarn was spun was the same. Mr. Howarth said that the conditions in the room were controlled by humidifiers, that one day it was raining hard when one of the sets was made and taken directly from the spooler to the warper and from the beam to the slasher while the other laid upstairs for a while before it was put on.

Mr. Heymer said he had had an experience similar to that of Mr. Howarth. After experimenting he had found that the yarn made in a heavy moisture showed a different ability to absorb the size than that spun on a dry day.

The next question brought up by Mr. Petrea was whether anyone had arrived at a concrete and specific way of telling and knowing the lightness or heaviness of the size in the size box at any time during the running of a set of warps, other than the guess method of feeling the yarn. In starting the discussion Mr. Petrea read an answer sent in to the questionnaire, saying that, "The only method is the use of the hydrometer, but the usual method is one of personal judgment and interest."

Mr. Heymer agreed that the only concrete way to determine it "is by the use of instruments just like you use an instrument to test your speed or temperature, or test the viscosity of your starch, to see whether it is heavy or light. Of course, a man with years of experience can tell what viscosity he has in his starch."

"If we could get some specific or concrete method, mechanical or otherwise," said Frank Bradley, assistant superintendent, Eagle & Phenix Mills, Columbus, "so that a man could check up on himself by testing the size in the size box to see if he was running what the man next to him is supposed to be running, it would certainly be a great improvement. In other words, say you have nine or ten slashers—of course every slasher man has some little different idea about his set of warps from the next man, and if we could adopt some way, mechanical or chemical, so that each slasher man could go to his size and tell that it is exactly what it is supposed to be—and the other men could tell that theirs is just exactly what it is supposed to be—we would eliminate a whole lot of the trouble we have with bad slashing."

"My method of keeping track of that," said J. Walter Hames, superintendent of the Exposition Cotton Mills, Atlanta, "is that we weigh all sets that go on the back, and then it is very easily figured as to what our beams should weigh on the front with a given percentage of size. We never run more than one beam either too light or too heavy from our standard in that way. If we find our size varies from our standard too much, we go back and remedy it."

Mr. Arnold asked whether in checking up the weights on the front of the machine, if Mr. Hames checked the moisture content of the yarn. Mr. Hames said he didn't do this; he depends entirely on the feel of the yarn to get the moisture content.

"I think the moisture content could easily vary," said Mr. Arnold, "when you go by the feel of the yarn at the slasher. Personally I have made no test, and I go on the law of averages to some extent. In general I stay in luck, even though I have a bad day once in a while. I don't see how you can test the percentage of loss by weighing the warps on the back or front unless you know the moisture content on the back or front."

Mr. Howarth said he didn't see what he was driving at. "I don't exactly see why there should be undue lightness or heaviness when the size comes from one source, unless you should have leaky valves or something like that. Mr. Arnold was talking to me last night along that line. Sometimes the valves get to leaking, and you might cut that down, but there was a time, you know, when the argument was that we should have closed pipes in the size box because of water of condensation coming in from the open pipes to thin out the size. That was a trouble easily offset, when you figured that your evaporation is about equal to the condensation. I feel that I can go to the front of the slasher and put my hand on the yarn and tell pretty accurately whether I am coming out all right.

"But if a man wants to test from the size box—not from the kettle where the supply is coming from—I can't see any other way except to get a vessel of some kind and dip it up. If he knows what he wants, say 20 drops to the minute, and then takes the temperature right over his size box, which will produce that, it will remain pretty nearly the same. If he is right when he has 20, when he

gets 21 he knows he is a little thin; he is a little thick when he gets 19. That is the only way you can tell, to take each individual size box, to know whether he has a thick or a thin size."

Mr. Petrea read another answer which stated that "The slasher tender ought to know the size that the warps must stand, for when he knows these, he can proceed by the guess method of feeling the yarn between the finger and thumb. One might specify a concrete way by trying to cook the size batches all alike, running on one construction. I do not believe in hard and fast rules and formulas in slashing, but a good brainy overseer or slasher tender who has his work at heart can get results and can tell when the size is okeh and when it isn't."

The next question taken up related to the new hot air slasher which was fully described in the September issue of Cotton, on page 1117. The question, as stated in the questionnaire, was, "What advantage, if any, would a hot air slasher have over the cylinder slasher?"

Inasmuch as this machine is a new and revolutionary proposition, the chairman asked Fred Dickinson, of the H & B American Machine Company, to explain it and to answer any questions that might be asked concerning it. "The principle of the new air drying machine is that instead of using copper cylinders we take the yarn and run it over swifts," said Mr. Dickinson. "That is, in running through the machine the warp is split about 50-50 instead of going on copper cylinders and only one side being dried. We run it over swifts which are on ball bearings, which puts less tension on it. On this machine in a mill where they have been using these machines, the production is a yard per second or sixty yards a minute against about thirty or forty yards per minute on the cylinder slasher. The amount of steam consumed is about thirty per cent less than with the regular cylinder slasher. There is no flattening of the threads; there is no tension. It runs over the swifts, which work like a hexagon swift—you get rounder yarn and the breakages in this mill are as one to three—that is, there are three ends break on the cylinder slasher against one on the hot air machine. It is possible to take an end of this warp and with one finger pull it through the entire machine. There is no chance of an explosion, and you can turn the full boiler pressure on and it would do no harm in regard to blowing up the pipes."

Mr. Arnold asked how much power the new machine would consume. Mr. Dickinson said that with the regular cylinder slasher, the power consumption is estimated at 1½ to 2 horsepower while with the new machine it would not be over 50 per cent of this amount.

"Is there any noticeable difference in the quality of the goods?" asked Mr. Grimes, of Athens. "Oh, yes," responded Mr. Dickinson. "In this mill they say they have no flat threads. There is no surface that it runs against. Another thing: they do not have matted yarn."

"What numbers of yarn?" asked Mr. Grimes. "They use yarns from 14s up to 30s and 40s," said Mr. Dickinson. Mr. Sweet asked a question with regard to the procedure when an end breaks in the hot-air machine, but Mr. Dickinson could not answer this from his experience. Mr. Dickinson later explained that the swifts work on ball bearings and that inside the swift a fan revolves on roller bearings. He also added that these machines are located at the Brookside Mills, Knoxville, Tenn., where he felt sure the superintendent, L. H. Brown, would be glad to exhibit the machines in operation to visiting mill men.

"What do you do with the size left over in the kettles after a day's run?" was the next question asked by Mr. Petrea. To start the discussion, Mr. Arnold said that "we try to have as little left over as possible, but what we have we drain back into our circulating kettle and we fill it up the next morning."

"Same here," said Mr. Howarth. "We stop mixing a certain time in the afternoon so as to have as little as possible left to run back. We drain it back to the storage kettle and keep it the same temperature with a closed coil."

"We re-build ours," said Mr. Seymour, of Griffin. "We have a variety of goods and each slasher has a separate size kettle on it. We re-build it each morning."

Mr. Jones, of Canton, said that "I have found that if you let it cool off during the night and heat it up the next morning that there is quite a bit of condensation which increases the volume in the size kettle, and consequently we have undertaken to determine by experimenting just how much that is and cut that much water out in the last two

kettles at night. That will give you the same consistency of size that you had to start with."

One man, reported Mr. Petrea, puts a coat of tallow over what is left in the size box and that acts as a preservative to the mixture. Mr. Howarth brought out that sometimes different compounds at the same temperature would keep for varying periods of time. Mr. Gurry said that he does not consider it worth while to use left-over size and that he now disposes of all that is left in the box.

Mr. Petrea next read the question, "Should the immersion roller be run the same depth in the size box for different numbers of yarn?" Mr. Barnes, of Atlanta, said "if I was running 12s or 8s warp I would not go quite so low as if I was sizing 30s. In other words, I have a circulation system, and the size stays the same depth in the box and circulates properly. If you went high on the finer yarns you might find you would have a soft yarn."

"Would it put a strain on the yarn on fine numbers to run it deeper?" asked Mr. Grimes. "No, sir," responded Mr. Barnes.

"The finest yarn we make is 22s," said Mr. Bradley, "and about five years ago we found it almost impossible to make the slasher men keep the immersion roll down in the box. They said it would break the warps up. I truly believe that by their running it out that there was not near as much breakage, but there were lots of warps that were not half-sized. Since that time we have adopted a rule that every man runs the roll down, and then we make the yarn strong enough so that it will stand the strain."

"I should think you had too much weight on your section beams," suggested Mr. Barnes, "causing extra friction. If you had the proper tension back there, I don't see why you should have that trouble."

Mr. Bradley explained that this work was beam dyed and the beams were pretty heavy, being wet, but that they ran them with just as little weight as possible.

On fine yarns, said Mr. Gurry, it is his practice to use two size boxes—with a lighter size, of course.

Mr. Howarth was asked for his opinion on this question and said that "I don't pay a great deal of attention to it as long as I have it covered. I was running a certain compound once that formed a scum on top and there was very little change in the mixture. At that time I brought the immersion roll up to agitate it. Generally speaking, however, my numbers of yarn don't vary enough for me to discuss this question. In a former mill where I worked I ran 40s and I ran those 40s along with some 16s. If we ran the 40s after we had been sizing the 16s for about a week, with the roll run down, and didn't bring it back up, we'd have a mess."

At this point Mr. Petrea read some answers from the responses to the questionnaire: "We do not think it good practice to run the immersion roller at different depths for different yarn numbers. The construction of the size box will determine the best position for this roller which would hold good for any reasonable variation in yarn counts." "I think the finer yarn you run on the slashers the deeper you would want to run your immersion roller. If you are running or using the same size for both fine and coarse numbers." "I get best results to run the immersion roll down the same on all my work and control the percentage of size in the mix." "Ordinarily we would not change the depth of the size immersion roller, but would change the size to get the results wanted. If this was not practical we would change the depth of the roll."

"I might say that our experience, sizing 23s, has been that if we get the immersion roller too deep we make tapes," said General Chairman Thompson. "We have found that to let the yarn come in contact with the immersion roller just before it hits the size is a better practice. We have also found that we can get the same weight on by that method. Mr. Pennington, our weaver, says that in his experience the moment the yarn comes in contact with the size, right then penetration takes place, provided the size is hot. We believe that we get better results by running the immersion roller as high as possible or high enough so that the immersion roller will come in contact with the yarn just before the yarn comes in contact with the size." He explained in answer to Mr. Petrea that he doesn't run his immersion roller all the way down, just low enough to let the yarn touch it before it goes into the size. Continuing, Mr. Petrea related the following experience:

"I might state in connection with this an experience my slasher man brought to my attention while running 8s to 19s yarn. He had a set of warps running and sometimes the slasher tender runs the immersion roll out of gear when he runs it up, and then in winding it back down it isn't level and even. When he ran it back to where it comes in contact with the yarn, he called my attention to the fact that he was having a certain amount of size being carried on the one side of the squeeze roller and not any on the other. He had to run his immersion roller down into the size before he could get the same uniformity of size on both sides of the squeeze roller."

Frank Bradley suggested that someone run a test with the roll as high as he could get it and as low as he could get it and report the results of the experiment.

Continuing the discussion, the chairman asked the question, "What are the causes of a warp being sized heavy on one selvage and light on the other, besides letting the size run down too low in the size box?" Mr. Barnes suggested that the discussion just preceding had explained that. Mr. Anderson, of Columbus, was of the opinion that if one end of the steam line in the size box is stopped up this difficulty would result—as one end would be boiling and the other cold. Mr. Howarth told of a friend of his who had a circulating system which was not a circulating system, because the inlet and outlet were located at the same side of the box, causing the fresh size to "come right in, and turn around, and walk right out again," so there was never any circulation on the other side of the box. By placing the outlet at the opposite side of the box the difficulty was overcome.

"I have had some trouble with that same thing," said W. L. Phillips, superintendent, Social Circle (Ga.) Cotton Mills. "My size entered on one side and also my main steam line entered the same side and branched off. I overcame that by tapping in the center of the size box at the bottom with the steam line, and then branched back to each end of the size box and ran my size pipe to the center. We do not use the circulating system; we use the size control which takes the size out of the kettle by gravity."

"When you let the size come in at one end of the box and go out the other, and the size comes in at a lower temperature than the size in the box, it will keep that end cool. In this coil that you have in the box you find some

instances where the holes in one end are larger than at the other, which keeps it hotter at that end, even if your size is coming in at the same temperature."

Mr. Petrea quoted one man as follows: "The usual method is to introduce fresh size from one side of the box. This side will always be the heavier. The better method would be to introduce new size from both sides of the box." Other quotations that he made were: "Condition of the flannel roll and having high and low places." "Generally the steam pipe is the cause of this, putting in more steam and thinning the size more on one side than the other." "If the blanket should slip or the size boil up more on one side of the box than the other it will cause the yarn to be heavier sized on this side." "In one or two instances I have known the stand of the squeeze roll to become worn on the lowest end of the size box enough to support some of the weight of the squeeze roll and cause the yarn to be heavily sized on one selvage."

An uneven tension on the sheet of yarn would cause it, too, added Mr. Arnold. This, he said, could be caused by the immersion roll being out of a horizontal plane, as previously mentioned. Mr. Gurry explained that one of his mills eliminated the trouble to a great extent by removing the blanket each night and letting it soak over night in cold water, having two blankets for each machine and using them alternately. The blanket that was soaked over night was dried the next day so as to be ready for use the following morning. Reading another answer, Mr. Petrea said, "Another man states that this might be caused by a difference in the temperature of the size in the size box and the size coming from the kettles, where the intake pipe is located in one end of the size box. Another cause would be that the axes of the squeeze roll were not parallel to the axes of the size roll, causing an unequal distribution of the weight of the squeeze roll."

The next question on the questionnaire was, "How often should strings be put in a warp to see that there are no taped places coming through?" Mr. Seymour, of Griffin, was called upon and said that "it depends on the kind of yarn and how often an end breaks. It should be done as soon as this happens and if you do not put it back you will get messed up. If I was running 25s warp I would check up on it every 500 yards. Coarser yarn doesn't break so much but it is necessary that we should get those ends up as often as they break."

Mr. Arnold expressed the opinion that a safe answer to this question would be, "As often as necessary." Mr. Barnes was again called upon, and said that he ran the weaving in one mill where when they got through with a set it looked like they needed a wheel-barrow to carry the laps off in. Now, he said, "we run at Exposition set after set and never cut a lap. I think it depends on the kind of warp you have back there."

"These taped places are very detrimental in the weave room," said Mr. Petrea, "and if they are overlooked, it causes trouble. We have one man here who says that, 'No set rule has been found that will work on this. An experienced slasher tender can easily determine when taped places are coming through, and run his strings accordingly up.' Another one says he runs strings in every four beams."

The final question pertained to colored work, and read: "What is the most practical and best way to slash wet work, that is, yarn dyed on section beams, where uniformity of sizing and good running work are required?"

The question having originated at Eagle & Phenix, Mr. Riviere said that "in times past we have had cylinders behind the slashers to dry the yarn partially before going into the size box, but we found this was very unsatisfactory because we had to run boiler pressure there in order to get enough drying capacity. It was very difficult to keep those cylinders packed so they would not throw water over everything. We did away with the cylinders, and have been blowing the warps out with compressed air as much as possible. That has not been altogether satisfactory because we cannot get them sufficiently dry. The size runs down, and we stop at stated intervals and run out a certain amount of that and run in some more. Lately we have rigged up a rack and as these beams come from the dyeing machines we blow them out with compressed air just as long as a drop of water will come out. None of these methods is altogether satisfactory and we wanted to know if we could get a little more light on the subject."

Mr. Grimes asked whether Mr. Riviere runs wet work and dry work at the same time. "Sometimes we do," said Mr. Riviere, "but the great majority of our wet work is all wet. Sometimes we have three beams of wet work and one of dry."

"We have wet work at our mill," said Mr. Petrea, "and we run quite a number of sets where we have three wet beams and three dry beams together. I have the cans on the back of part of the slashers. We also use air to blow the beams out just as dry as we can get them. When those sets run along toward the last, the size continually gets weaker and we have to add a little more starch."

Mr. Seymour had a question he wanted to ask. "We have been bothered some with warps chafing in the weave room. I would like to ask Mr. Riviere or others here if they have had the same trouble. This comes if we try to spread our 2,000 end warp over a 40-inch loom beam. We have tried cans but took them out." Mr. Riviere answered that he had no work that wide.

The variation in the wet work was reduced considerably, said Mr. Bradley, by having a different plan of handling the size. "In the morning," he said, "when the size man makes up his size, he dumps just enough size from the storage kettle to fill this man's size box up to get him started off. Then to compensate for the condensation or the water that goes into the size, he runs the storage tank above the size box about one-third full of size. Then he adds about ten or twelve pounds of starch with the necessary softener, and cooks this up in the tank above the size box so that when he loses that size in the size box he has a little bit stronger size to compensate for the water that has been let into the size box. By letting out about one-third of the weak size at about an equal distance apart two times on each beam and running in fresh size, this makes it a little thicker and we can approach uniformity."

Mr. Howarth put the following question before the men, and said he should appreciate any answers to it after the meeting. "A friend of mine has a sheet of about 6,200 ends, duck, and when it comes to his tying-in machine he has trouble because he has a lot of slack ends across the sheet. It doesn't bother his weaving but it does bother his tying-in. He's done most everything he can think of and still these ends come through, probably 10 per cent. Does anyone know of a remedy?"

Mr. Arnold mentioned a device he has invented which he felt would remedy this. (This device for the slasher is fully described on another page of this issue.—Editor.)

The Luncheon.

After a photograph had been taken of the members, the usual luncheon was served in the Pompeian grill room of the Biltmore, with Oscar D. Grimes, vice-president and general manager of The Athens (Ga.) Mfg. Company, and vice-president of the Southern Textile Association, serving as toastmaster in a very efficient manner. At the luncheon a number of talks were made, the first being by F. H. McDonald, industrial engineer of Atlanta, who spoke on the cost-reducing factors in industry. Next J. Wheeler Mears, Sr., superintendent of the Monroe (Ga.) Cotton Mills, spoke briefly on the relation of the overseer to the superintendent in the management of help. Following Mr. Mears, the chairman called upon Frank W. Gurry, president of the Eatonton (Ga.) Cotton Mills, and southern manager for the Stockton Commission Company, with headquarters at Charlotte, N. C., who outlined, an experimental station established by his company. As this talk was along the line of weaving development it was very apropos at this meeting.

Weaving Developments.

Mr. Gurry said in part:

When I crawled out of the Pullman this morning I thought that I would have nothing to say at this meeting, but I was so impressed with the earnestness of the discussion this morning and with the possibility of being of assistance to the fellow, who was actually in trouble, that I asked for permission at some time during the day to tell about our weaving experiments and developments.

Six years ago my associates in New York said, "What can we do to be of actual service to cotton mills?" That might seem like a very simple question to answer. However, it took us a year before we came to a decision, and our decision was this: that we would engage a man who had been through the field and through the mill, and who was considered one of the best weavers in the country. We found such a man in New England, a man who had held a very responsible and high-salaried position, but who had retired. We gave him one room in an obscure building in Baltimore. It is true he had the yarn markets of the world at his command. He did as he saw fit and whatsoever he desired. He went to weaving. The first year he brought out fabrics that have been patented, and they were so new in the textile weaving world that the best men in Washington were put on an investigation and they went to the weaving ends of the earth to satisfy themselves that this had never been done before on a loom. Our patents were granted. That was a source of encouragement. As the years went on, this man surrounded himself with weavers like himself, dreamers if you will, faddists, theorists, or any other kind of "ists" you want to tack on to the ends of their names, but yet men, who could take a wrench in their hands, and go to a loom, and work out their ideas. This plant developed from one loom into fourteen, now including almost every type of loom ever made, from the Jacquard down.

Now this plant has been moved to Patterson, N. J., solely for one reason. We can do the same work in Baltimore or Kalamazoo, that we do in Patterson, but the first of this year, when I told the buyers and users of the merchandise made by the mills in this country what we were doing, they simply swamped us in this way: The buyers of merchandise in this country have been tearing their hair for years to find something just a little bit new, that is, a little bit out of the ordinary, but of the same basic character perhaps, saying, "If I can get it woven this way instead of that way, I can take 20,000 pieces and get several cents a pound more for it." The selling agents of today, I am not criticizing, but these buyers have been going to those different agents and these people in turn have said, "We have not any method of weaving this character of cloth. We will send it down to several of our connections and see what they will do with it." The idea goes down. It is not in concrete form. It gets down to the mill, and the president or treasurer or executive in charge is not a practical mill man. He turns it over to his superintendent. The superintendent has been grinding out four-yard sheetings from an average number of 20s yarn for years, and he doesn't want any change in his organization. Things are resting prettily, and he says, "Our looms will not make that." So back to the New York selling agent goes the report, and the buyer says, "Well, put me down for so many pieces of the same stuff I have been using," and there it is again.

The buyers come to us today with these ideas. They go over and spend two or three days at our plant in Patterson, and see the efforts to take their ideas and mould or weave them into an actual piece of cloth. Now that cannot be done every time. If we are successful one time out of a hundred, we are big winners for the mill that may take on this merchandise, as well as winners for ourselves. The trouble today in our work is that we have not looms. Now that may sound rather strange to you. For five years that plant has been turning out on an average of three new samples a day. They have been stuck away in drawers because we shouldn't show them to the buyers as we had no looms to place them on. Now if this plant is going to be of any value to the textile industry, it must do two things: We cannot take that plant, and hide it under a bushel, and obscure the light only to those looms or mills that are associated with us. I would call that a pretty close and narrow way of working. But that plant today is open for any mill and its weaving problems. That is really the invitation that I wanted to extend to the mill men here today.

Now the average mill man, the average good weaver, says "I know what my mill can do. I know what my looms can make." He does not want to be told what his 40-inch loom can make. He knows the whole game himself as far as his particular mill is concerned. I am not taking issue with that man. I would have said the same thing five years ago, for I would not have taken off my hat to any man spinning yarns from 3s to 150s. Today I will take my hat off to the development of weaving that has come through and out of this plant.

The average mill man is confronted with his manufacturing problems, his labor, the buying of his cotton, the merchandising of his goods, and he does not have time to concentrate his entire energy and thought on the looms in his weave room. The mill man is not to blame because he is not able to diversify his product himself. He frankly has not time to do it; but you take four men such as this plant has, who have devoted their entire lives to weaving, remove all the obstacles and troubles and trials of

(*Continued on page* 1283.)

Towels and Toweling

BY T. WOODHOUSE AND A. BRAND.

Huckabacks. Of the many varieties of fabrics used in the production of different kinds of towels and toweling, perhaps none have greater or more deserved popularity than the class known as huckabacks, or, sometimes, briefly, as hucks. This class of fabric, which is probably of ancient origin, is found in all qualities, and is made from all linen, or all cotton yarns, as well as in cotton-linen unions, where the cotton yarn sometimes functions as warp and occasionally as filling. The huckaback weaves are also taken advantage of in other types of fabric.

The huckaback weaves appear to possess a peculiar suitability for toweling; hence their wide application for this particular kind of product. The prevalence of plain weave, which constitutes fully 50 per cent of the unit design, secures firmness of structure, while the comparatively long floats of warp and of filling in the remainder of the unit design help to produce a characteristically rough surface which readily absorbs water.

The contrast between the plain weave—which necessitates the maximum possible amount of interlacing—and the loosely-bound warp or filling floats, produces intermittent variation in the take-up of the warp yarn, and imparts a peculiar and pleasing distorition of the warp and filling;

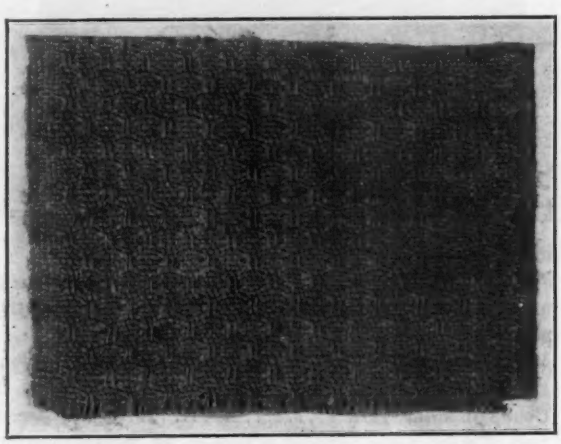


Fig. 65.

this distortion is one of the chief characteristics of this class of weave, and helps greatly to give the fabrics their distinctive appearance.

A typical example of the 10-thread 10-pick huckaback, often termed simply "ordinary huck," is reproduced in Fig. 65. The original is a heavy cloth, produced from partly bleached flax tow yarns, both warp and filling. There is very little finish on the fabric, and hence it, and similarly-treated fabrics, are often termed "loom huck." In the state as illustrated there are 36 threads per inch, and 34 picks per inch. The illustration shows the warp float side of the texture (the weft floats being at the back) and at the left hand side is a selvage. A few warp threads have been removed from the right-hand side in order to exhibit more clearly the characteristic distorition of the filling. Close examination will show that the filling lies in a series of equal groups; the picks lie close together where the long floats have been situated, and are spaced wider apart, where they have been interweaving with the warp in plain order.

Four repeats of the unit weave are shown at M, Fig. 66; one complete unit is in solid black squares, while the other three units are in crosses. To construct the weave, alternate blocks of 5 threads and 5 picks are filled in with the double crossed lines, while the remaining two blocks of 5 by 5 are filled in with the plain weave and in such an order as to "cut" with the edges of the blocks first filled in.

The weaving plan is complete on 4 threads and 10 picks; one form is shown at N, Fig. 66, and is the form suitable for use with the so-called "huckaback draft," 1.3.1.3.1.4.2.4.-2.4. This particular draft lends itself very readily to a

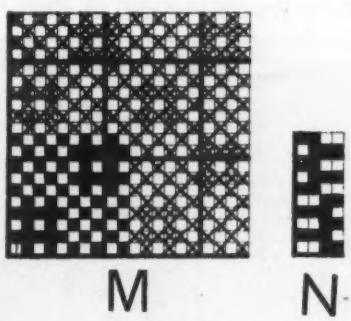


Fig. 66.

change-over from plain weave to huckaback or vice versa, and is more fully discussed in connection with Figs. 67 and 68.

Typical examples of linen huckabacks are woven in 900 or 1000 reeds (900 splits or dents or 1000 splits in 40 inches) with 9 or 10 shots or picks to the 37/200-inch glass, i. e., 9 × 5.4 or 10 × 5.4 shots per inch. The warp may be 20 to 25 lea count, while the filling is, say, 20 to 22 lea count, and both yarns might be either ¾ bleached, half bleached, or boiled line.

The following is an analysis of an actual sample of linen huck toweling. The sample analyzed measures 2 5/16 inches in the way of the filling, and 1 15/16 inches in the way of the warp. These measurements give a square area of 4.48 square inches, and the weight of the sample is 14.32 grains. If the toweling is to be 27 inches wide, the weight of one running yard of cloth will be as under—

$$\frac{\text{14.32 grains} \times \text{16 oz. per lb.}}{\text{7,000 grains per lb.}} \times \frac{\text{27 in. wide} \times \text{36 in. per yd.}}{\text{4.48 sq in.}}$$

$$= \frac{27838.08}{3920} = 7.101 \text{ ozs. per yard}$$

say, 7 ounces per running yard. The weave used is the 10 by 10 ordinary huck exactly as shown at M in Fig. 65.

In the cloth analyzed there are 94 warp threads in 2 inches, while a filling thread withdrawn from 2 5/16 inches wide sample measures 2 11/16 inches when fully extended or straightened out. The threads per inch in the reed must therefore be as follows—

$$\frac{\text{94 threads}}{\text{2 inches}} \times \frac{\text{2 5/16}}{\text{2 11/16}} = 40.44 \text{ threads per inch, say 40}$$

threads per inch in the reed, which is equivalent to an 800 reed on the 40-inch scale with 2 threads per split or dent.

There are 9 shots or picks to the 37/200-inch glass; hence—

$$9 \div 37/200 = \frac{9 \times 200}{37} = 48.6 \text{ picks per inch, say 48}$$

picks per inch.

The warp is half-bleached line yarn. Six withdrawn warp threads, each 2 1/16 inches long, weigh 0.43 grain. Consequently—

$$\frac{\text{6 threads} \times \text{2 1/16 in.}}{\text{36 in. per yd.} \times \text{300 yd. per lea}} \times \frac{\text{7000 grains per lb.}}{\text{0.43 grains}} =$$

$$\frac{770}{41.28} = 18.6 \text{ leas per pound.}$$

Allowing for the loss in weight of about 15 per cent due to bleaching, the spun count is probably 16 leas per pound or 16s yarn.

The filling is half-bleached line yarn, and 6 picks, each 2 11/16 long, weight 0.46 grain. Therefore—

$$\frac{\text{6 picks} \times \text{2 11/16 inches}}{\text{36 in. per yd.} \times \text{300 yd. per lea}} \times \frac{\text{7000 grains per lb.}}{\text{0.46 grain}} =$$

$$\frac{1505}{66.24} = 22.72 \text{ leas per pound.}$$

Allowing for the loss in bleaching, the spun count is 20 leas per pound or 20s yarn.

Since a warp thread withdrawn from 1 15/16-inch cloth measures 2 1/16 inches when fully extended, the "laid length" (length of warp) to weave 100 yards of cloth will be—

$$100 \text{ yards} \times \frac{\text{2 1/16 in.}}{\text{1 15/16}} = 106.45 \text{ yards or, say 107 yards.}$$

Lastly, since a filling thread withdrawn from 2 5/16-inch cloth is found to measure, when straightened, 2 15/16 inches, the reed width required to produce 27 inches finished cloth can be found as follows—

$$27 \text{ in.} \times \frac{\text{2 11/16 in.}}{\text{2 5/16}} = 31.38 \text{ inches, or, say 31½ inches.}$$

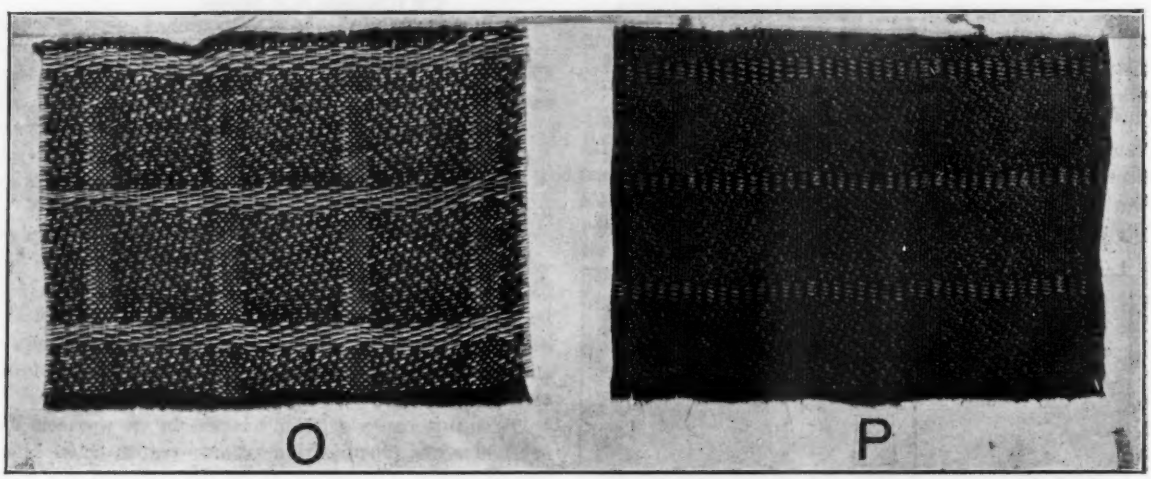


Fig. 67.

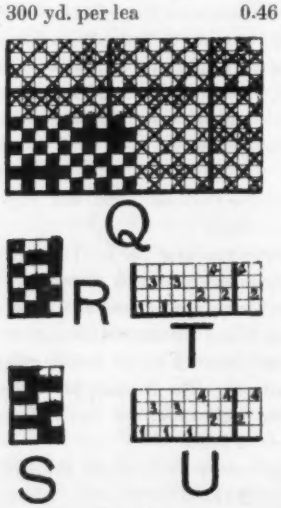


Fig. 68.

A second example, analyzed in a similar manner to that above indicated, gave the following results:

Weight of fabric	9½ ozs. per yard
Count of warp yarn	18 leas per lb.
Count of filling yarn	15 leas per lb.
Sett of warp	45 threads per inch
Sett of filling	39 picks per inch
Reed width for 36-in. finished cloth	38¼ inches
Laid length to weave 100 yards	108 yards

An interesting variant of the ordinary huckaback weave is that commonly known as the "Devon Huck," and sometimes as the "medical huck," particularly the heavy fabrics. Photographs of samples of such a fabric, woven with cotton warp and filling, are reproduced at O and P in Fig. 67. The former sample exhibits the warp float side of the fabric which is usually uppermost in the loom during the weaving process, while the latter sample shows the filling float side of the same fabric.

The general effect of the weave on the face side is very similar to that of the ordinary huckaback—compare with Fig. 65—but the weave itself has at least one distinctive property, viz., it is invariably woven with double filling, i. e., two picks in a shed, and this gives to the back of the cloth a modified resemblance to the back of a 10 by 10 huckaback.

(*Continued on page* 1291.)

Human Relationships in Industry

BY W. M. McLAURINE.

"Transferring and Promoting Workers."

The idea that I have been trying to convey and impress upon those who are interested in this work is the building up of a stabilized working force. To state it in another way, just as we have in our family certain educational, social and industrial divisions for the carrying on of the work of a complete, happy, harmonic, progressive civic unit, just so in our industrial family there can be inculcated principles of growth, loyalty, stability, and all of those nobler characteristics which will weld the working group into an abiding unity.

It has been said that the test of efficiency of a plant can be measured by the length of service of its average employee, and the test of value of an employee can be measured by his services with a company.

There may be modifications of these statements, and likely are, but under healthy and wholesome conditions, and on an average, I believe that they are very determinative.

The topic for this conference is "Transferring and Promoting Workers." This subject naturally implies two things which are facts in any progressive organization. First, there are opportunities within the organization for transfers and promotions, and, second, there are people within the organization who will require transferring and promoting.

Some of the reasons are so manifest that it may seem unnecessary to develop them. But since this is an academic discussion of a practical subject, it will not be amiss to discuss a few. The following reasons are given as leaders for discussion, and in no sense are they intended to be complete and final.

Some of the reasons for transfers:

1. To fit the worker to the job for which he is best fitted.

2. To place him in a more congenial group. Sometimes a worker needs to be separated from his congeniality, and again, a separation from his "buddie or pal" creates a disposition which manifests itself in his work and that of the group.

3. To give the worker a broader vision of the work. This is of value for two reasons, as it seems to me. First, to enable the worker to have a sense of the coordination of processes and thereby have a greater respect and appreciation of his own work in its relationship; second, there is always a demand either active or latent for promotions to higher positions, and this method will have a broadening influence, and make for a preparation for this.

4. Deadly dull monotony sometimes gets possession of the best of us, and a change, however slight, often acts as a splendid incentive to spur us on.

5. Sometimes friction arises between workers, or between a worker and the overseer. We shall not discuss the blame here, but the friction may be of such a type that the worker can not do his best service in that group. A change may keep him employed, and make for the company a good man.

6. Sometimes the health of an employee demands a change. Our factories should strive to build men, as well as turn out a manufactured article that society demands. A real progressive industrial organization will try to safeguard the health of its workers. A healthy body often makes a healthy mind, and a healthy mind nearly always makes a happy, efficient worker.

7. The law of supply and demand, or factory conditions may necessitate shifting workers from one department to another. It should be a fundamental principle in every industry that the industry should endeavor to care for its employees in the matter of furnishing them work at least. For this reason, it is necessary that all workers should know more than one job or process, otherwise transfer or shifting would be impossible.

8. To create in the mind of the worker the feeling that the industry is willing to do everything in its power to help him make good. The reaction in the mind of the worker will be a very fine attitude toward the industry and its officers. Cooperation on the part of the worker will be the logical result.

9. If carried on properly it will bring about a more active cooperative spirit between overseers and enable them to talk over their executive and supervisory problems together, thereby causing a better understanding of their problems.

As suggested before, these reasons are by no means complete or inclusive. They are only given that the conference leader may get his group to thinking about the subject.

Below are a few cases which will add further to the discussion. It must be kept in mind in all of these conferences, discussion is the great asset. When the mind gets agitated, it is going to come up out of its rut and look around.

In discussing these cases there are some questions to answer:

1. Was a transfer necessary? Why?
2. What is to be done if transfer is not necessary?
3. What was gained by transfer?
4. Who shall be the judge as to the necessity for a transfer?
5. How far should overseers cooperate with each other in transferring workers?
6. Should they always be made as soon as necessity seems to demand, or should the cases be studied?
7. Should the inconvenience of the overseer be a reason for refusing?
8. When should transfers not be made?

There may be other questions, but these will get the group going.

The cases follow:

I. Two girl chums were in the same spinning room, and one day a girl was needed in another spinning room up stairs. The overseer took one of them and placed her there. After a few days, the girl who was left down stairs came to the overseer and asked to be placed up-stairs with her chum. What should the overseer have done?

II. A young and ambitious boy, who was a good card hand and had done excellent work in his department had some trouble one day with the card-grinder. After that he felt that the card-grinder had it in for him. He asked the overseer to try to get him placed in another department,

although he knew no other processes except carding. What should the overseer have done?

III. A boy working in the card room asked to be changed, stating that the dust and lint made him cough at night, and he feared it would injure his health. He was an A 1 worker, and his place would be hard to fill. What should the overseer have done?

IV. A young lad who was ambitious to learn the textile business was eager to be transferred to another department. He was a good hand, and had diligently worked on the job he had. The overseer had promised him for several months that he would change him, but the overseer in the other department would not take him. What might have been the reason? How could the matter be handled?

V. A rather mediocre overseer has an eager, energetic boy in his department, who is striving to learn every detail in the department. The overseer seems to have it in for him. The boy wants to be transferred to another department, and another overseer wants him. The mediocre overseer will not consent for a transfer. How would you handle this case?

VI. In a certain department there are two good workers, but they are slow and they retard production, and are not generally as efficient as the jobs require. What would you do?

VII. In one department there is a very popular overseer. His department is needing a few extra hands. In another department there is an extra supply, but this overseer will not consent to double up and let his help go over to the department that needs them. What may be the trouble, and how should it be handled?

VIII. In a department which had been running steadily for a long time on the same products, it was noticed that production was falling off. What might have been the reason, and how could production have been increased?

IX. A new employee was put on a job that an old employee had wanted for sometime. The job was in same department and the old employee felt that he could do it. He left the company. Was the matter handled right?

X. Have each member of the group mention at least one case he has had where he granted a transfer or refused it, and let the other members discuss it.

When should transfers not be considered may demand a little development to get the group to thinking on right lines negatively.

1. When the worker is simply a mill hobo. He is looking for a job without much work to do, or in the language of Mary Mixup, "he wants to be where he ain't."

2. When he has not shown the right attitude toward his present job. By this we mean industry, attention, study, application and all of those nobler qualities which we like in workers.

3. When we feel that it will destroy the discipline of the worker and that means the discipline of the industry.

4. When it will be detrimental to the efficiency of the industry.

5. When it will create disorder and dissatisfaction in another department.

6. When it will furnish a precedent that will be difficult to follow.

7. When justice does not demand it.

The group may add as many reasons to this as they desire, but they must value each reason offered, and see that they are just.

The second phase of this conference is *Promoting Workers.*

In looking over job analysis of various kinds, and also in studying The Hiring Problem, there are two or three very suggestive questions, I have found.

1. Does this company promote its own men to superior positions, or does it go outside for its minor and major executives?

2. What does this job lead to? If I start to work here, to what job is there a possibility of my being promoted?

3. On an average, how long does one have to work on this job before he is transferred or promoted?

4. What does one have to do, or be, to be ready for promotion?

Any healthy, vigorous organization must have healthy, vigorous people working in it. People to be healthy and vigorous must be ambitious. Ambitious people are looking onward and upward, and the more they can see the more vigorous they should be. Growth is a principle of life, it matters not whether it is natural or artificial.

Any industry that desires to grow must furnish opportunity for growth. There must be opportunities for promotion. The more opportunities there are, the greater the growth. There must be clearly defined lines of promotion from the humblest position to the most exalted. They must stand out like signboards on the road to progress. The industry must impress upon its workers the qualifications necessary for promotion, and furthermore they must furnish within the organization opportunities for its workers to meet these qualifications.

When needing men for advanced positions it should, as far as practicable, take them out of its own organization.

I remember once, when I visited a large industrial organization, as I stood at the entrance waiting for admittance, I saw a big chart of the employees and officers on the wall. As I stood and looked at it, I could trace out from the humblest employee in the organization, the route to the presidency of the industry. As I stood there and looked at it, I thought what an inspiration it must be for the workers as they enter each day to be able to look over the route he can go to a position of greater responsibility.

It is said, when a valued executive of the Marshall Field Corporation died a few years ago, some one who did not know their organization, wondered where they would find a man to take his place. A man who knew their system calmly remarked, "We shall only look for an office boy." I am sure you understand the import of this statement without further comment.

A subject for discussion here might be "A Basis for Promotion." If you will refer to the conference you will refresh your mind on the subject of "Rating Help." Also the one on "Rating Overseers." Those suggestions may be of value in establishing a Basis. The following questions may start the group to thinking:

1. Would length of service in the employment of the company be a fair basis or necessarily constitute one factor in the basis? Why?

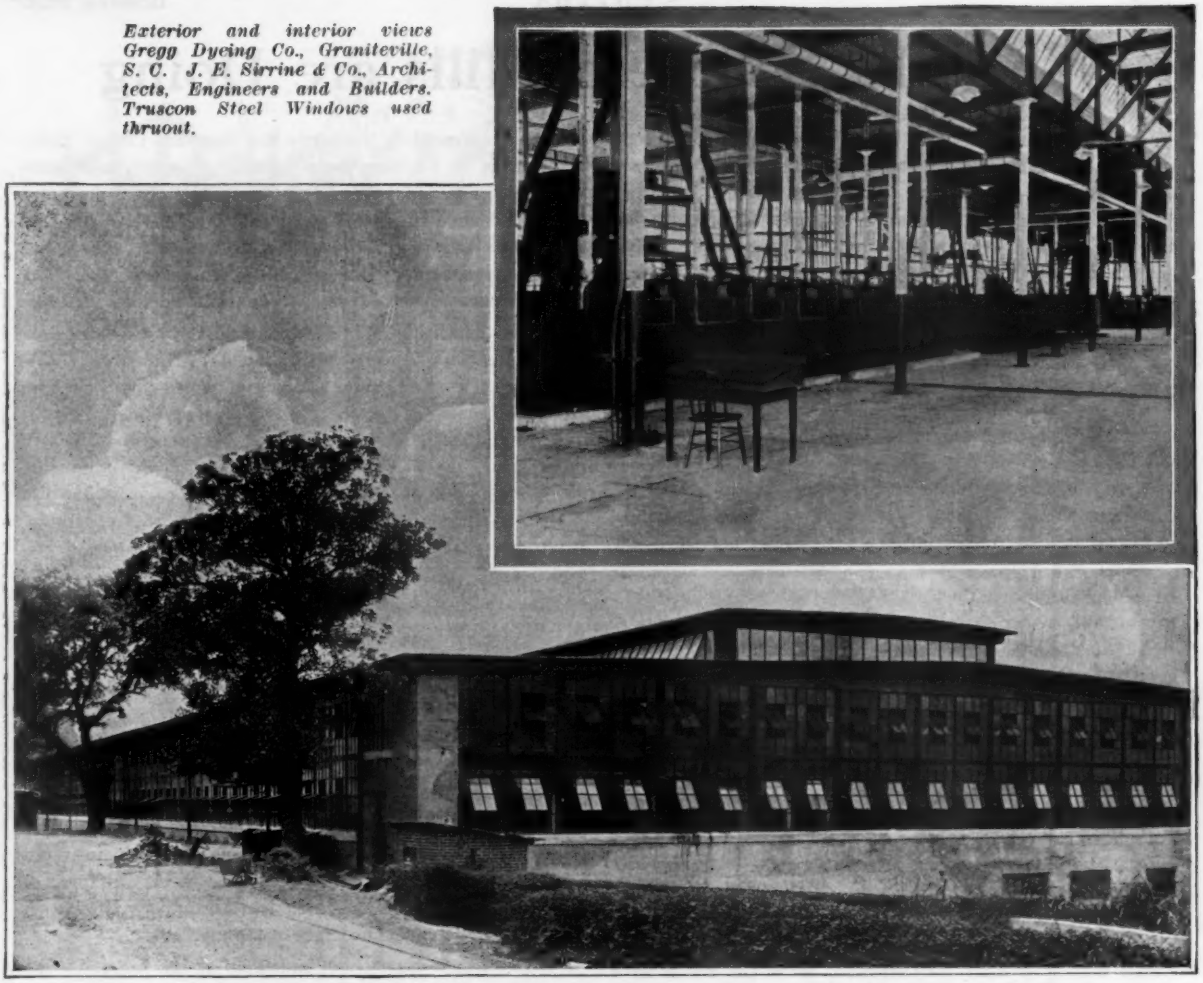
2. What are some of the superior abilities that you recognize in your department?

3. How do you recognize and evaluate them?

4. Do all men have the desire and capacity for advancement? Give reason for your answer.

(*Continued on page* 1293.)

Exterior and interior views Gregg Dyeing Co., Graniteville, S. C. J. E. Sirrine & Co., Architects, Engineers and Builders. Truscon Steel Windows used thruout.



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TRUSCON STEEL WINDOWS

What the Southern Mills are Doing

Among the announcements of improvement and new construction work among the southern mills during the past month were the following:

The new $250,000 plant erected at Geneva, Ala., for the Geneva Cotton Mills has been completed. The mill building is 325 by 106 feet, of brick construction with tar and gravel roof and maple floors, and carries an installation of 5,280 spindles and 164 looms. D. N. Morris, Jr., is president and James Johnson, Jr., secretary-treasurer. C. C. Cobb is superintendent.

Contract for the installation of motors, transformers, switchboard and lighting in the new 30,000-spindle mill of the Tallassee (Ala.) Mills has been awarded to Huntington & Guerry, of Greenville, S. C. The electrical equipment was purchased from the Westinghouse Electric & Manufacturing Company. J. E. Sirrine & Company are the engineers.

Some Pine Bluff, Arkansas, business men have subscribed $150,000 toward the establishment of a 10,000-spindle cotton mill, which Leroy A. Beers, of John K. Stewart & Sons, Amsterdam, N. Y., and associates, are contemplating erecting at Pine Bluff.

Western Cordage Company, Orange, Calif., is arranging plans for a new one-story addition, 48x120 feet, to cost about $10,000, exclusive of equipment.

The Adams Cotton Mills, Macon, Ga., have been sold to C. B. Willingham and B. Terry Adams, and the name of the mills has been changed to the Adams Investment Company, Operations have resumed in the mill, which has been closed for some time.

J. B. Roberts, president of the Roberts Marble Company, at Ball Ground, Ga., is interested in the establishment of a cotton mill at or near Ball Ground, plans for which have already been made. Mr. Roberts has recently developed a large water power on his properties near Ball Ground, the big concrete dam having been just completed.

The Newnan (Ga.) Cotton Mills have started an addition to the No. 1 Mill and will install 18 cards and 3,500 spinning spindles, which have been purchased. The dye plant will also be changed.

A special course in textiles is contemplated for the grades of the Junior High School of the Southwest LaGrange High School for the ensuing school year. This course will be in addition to the regular work of preparing the pupils for Senior High School, and will probably consist of an elementary survey of the textile industry, industrial geography and history, textile arithmetic and rudiments of designing, cotton grading and other textile processes.

It is reported that the Hillside Cotton Mills, LaGrange, Ga., are considering the erection of a central power plant on property recently purchased.

A new addition is being built at the Shelby Cotton Mills, Shelby, N. C., which will provide larger floor space in the weaving and cloth room departments. A 300,000-gallon reservoir is being erected on the mill grounds.

Erwin Cotton Mills, Duke, N. C., has let contract for the erection of a dyehouse, 211 x 102 feet, one story and basement, to be of reinforced concrete and daylight construction with monitor roof. The building will be used for long chain dyeing of warp yarns for blue denims. J. E. Sirrine & Company, Greenville, S. C., are the engineers.

The Monroe Mills, formerly the Bearskin Cotton Mills, at Monroe, N. C., have been opened under the new management. The plant has been thoroughly overhauled and some new machinery installed on the third floor, which formerly held no equipment. R. W. Morrow, of Monroe, and the Johnston interests of Charlotte, purchased control of this mill some time ago when it was sold by receivers.

A new school building, a gymnasium and a teachers' dormitory are being constructed at the Art Cloth Mills, Lowell, N. C. The gymnasium building is of brick construction, with two stories and basement; it contains class room, offices, gymnasium, locker room, and shower baths. The school will be of brick, one-story, with class rooms and an auditorium.

J. E. Sirrine & Company, Greenville, are engineers for the addition of a weave shed to the Excelsior Mills, Union, S. C. This will cost in the neighborhood of $75,000, it is announced, and will be three stories, 116 x 146 feet. It is planned to install about 220 looms, according to the report, for the initial equipment. Emslie Nicholson, of Union, is president of the mill company.

The plant of the Cash Manufacturing Company, at Blacksburg, S. C., which was begun some time ago, will be taken over and completed by the Blacksburg Spinning Mills, a company organized recently with a capital stock of $200,000. The work of completing the main building and erecting 25 operatives' houses is under way, and machinery contracts for a 5,000-spindle equipment for producing knitting yarns, 16s to 24s, have been let. S. A. Clifford, of Clover, is president, and C. N. Alexander, Clover, is treasurer and manager of the company.

According to report, the managers of the Republic Cotton Mills, at Great Falls, S. C., are understood to be giving consideration to the erection of a 30,000-spindle mill for the manufacture of cotton yarn to be used in the manufacture of the company's product of fine cotton and silk mixtures, which is the output of the new Republic Mill No. 3, recently completed.

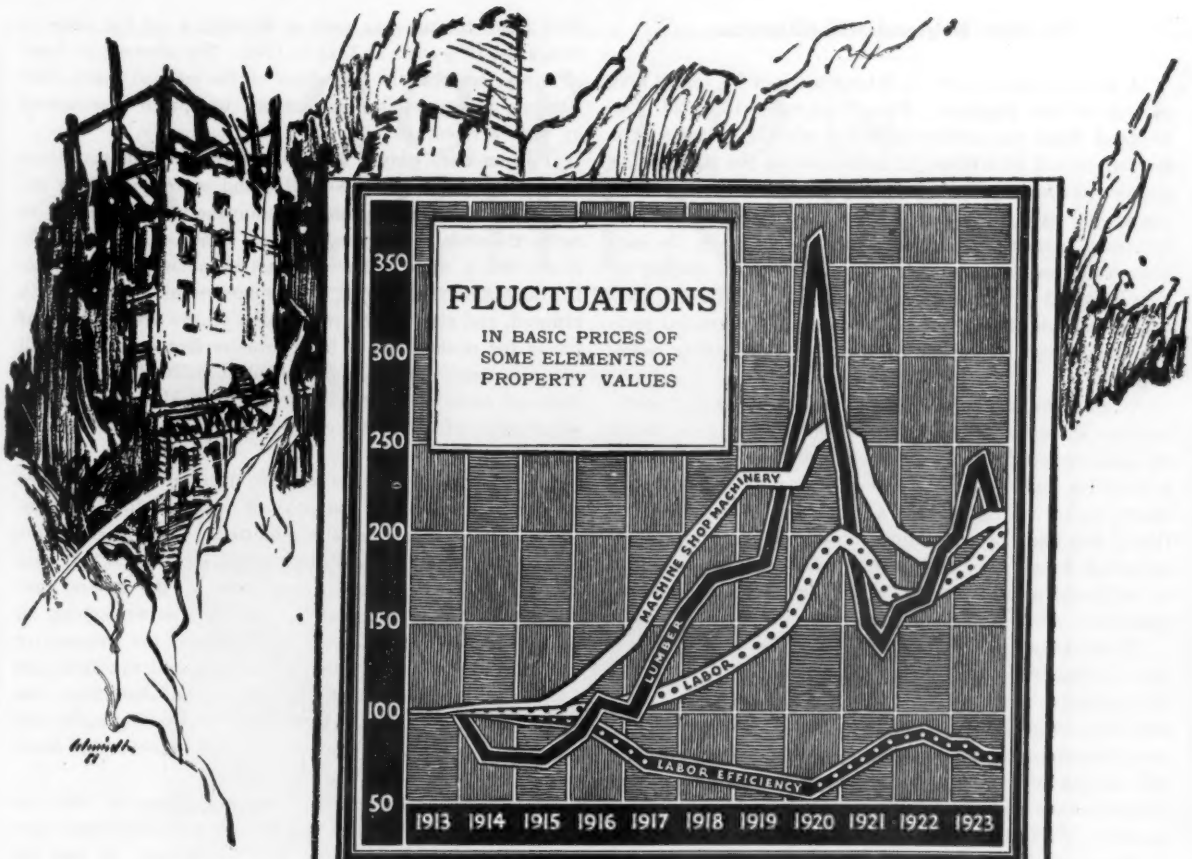
The Alice Manufacturing Company, Easley, S. C., has placed contracts for 12,000 additional spindles to be installed as early as possible.

The sewage and water works system for the village of the Arcadia Mills, Arcadia, S. C., has been completed, with Lockwood, Greene & Company, Charlotte and Boston, as engineers in charge. The cost was approximately $70,000.

Contract has been let to the Inge Construction Company for the erection of the plant of the Mexia Cotton Mills, at Mexia, Texas. The initial equipment will consist of 5,000 spindles and 96 30-inch looms and 32 40-inch looms, the looms being purchased from The Stafford Company, Readville, Mass. J. K. Hughes is president of the mill, and Perry Burrus general manager. Robert & Company, Atlanta, are the engineers.

It is reported that M. F. Wintry, 2722 Hemphill Street, Fort Worth, Texas, with associates, is planning the erection of a 5,000-spindle mill at Stanford, Texas.

Lockwood, Greene & Company are preparing plans for the building of the new Hanes Dye and Finishing Co., Winston-Salem, N. C., which will be 120x240 feet, of brick construction. The plant will dye, bleach and finish piece goods, khaki, denims, etc.



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To properly insure, the value must be definitely known. To collect in case of loss, the value must be provable.

In spite of this, two businesses out of every three guess at the value and have little or no proof for it.

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INVESTIGATIONS VALUATIONS, REPORTS — INDUSTRIALS, PUBLIC UTILITIES, NATURAL RESOURCES

An American Appraisal

THE AUTHORITY

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The New England Mill Situation.

A gradual improvement is taking place in the textile mill outlook in New England. From September 15 to 20 New England Week was celebrated and it was the occasion of a decided revival of interest in industries on the part of the general public. Started originally as a consequence of a suggestion made last spring to the National Cotton Manufacturers' Association by President Robert Amory, the suggestion of New England week developed into a display of New England products in stores and exhibition halls, parades of a trade character in some cities, and a general publicity campaign conducted by many of the leading newspapers.

While there was a great deal of the boosting and booming idea abroad in the section, and while it was quite unlike the conservative spirit of this section, it did serve to arouse a healthier tone concerning the current public view of industry in its relation to the general weal. It is believed that it has laid the foundation for a greater degree of cooperation between general business men and the managers of industrial plants, and it is hoped that it has checked the pessimistic drift of investment thought in the whole section.

The displays in New Bedford, Fall River, and Pawtucket were especially illuminating as to the wonderful variety of the products turned out not only in textile lines but in general commercial lines. These three centers were visited by many merchants from New York and other mercantile centers and as the displays occurred in large halls it was possible to secure a very comprehensive grasp of the industrial resources of New England.

Many of the large mills and selling agencies supplied retail stores with merchandise for display and sale, thus creating a better knowledge among the general public of the character of merchandise made in their own vicinity.

The mills in the section are resuming operations slowly. The fine goods end of the cotton goods industry has shown a distinct gain in the volume of business booked. A large part of the orders consist of broadcloths, warp sateens, silk and cottons in plain and fancy weaves, and a wide variety of rayon mixtures. Some of the latter will not appear in the markets until spring but sample pieces already shown indicate that the new rayon goods are certain to occupy a large place in wash fabrics merchandising during the coming season. Some are plain crepes but many are fancy dress fabrics and finer cloths for lingerie purposes.

Fall River has been showing less gain in activity than some of the other cities as the demand for print cloth yarn goods has not been large enough as yet to lift prices to a basis that will insure profit for the mills there. New Bedford is now operating fully 70 per cent capacity and its manufacturers are hopeful of a further business as the needs of converters and others grow more pressing. Fall River is operating barely 45 per cent.

The wage outlook in New England is becoming complicated. Some mills have reduced wages, notably in the smaller centers. These reductions have been accepted. It has not been possible to induce manufacturers as a whole to agree upon a wage reduction, yet it is stated that the Amoskeag Company and some others are endeavoring through personal contact with employees to secure assent to a reduction of 12½ per cent, or at least a restoration of the wage scale existing before the advance of April, 1923.

The New England wage schedule of today is two and a third times the pre-war scale or 50 cents a cut for weaving as against 19½ cents in 1912 to 1916. The advance in April of a year ago was the last straw on the back of many New England mills and it really caused the pinch accentuated by high cost cotton.

Politics have played a large part in the administration of mill affairs in many New England centers and they account for the inability among manufacturers to agree to revise the scale at the present time. There seems to be little doubt that a wage reduction must be made after election, for the reason that a great many southern mills have already reduced, and also for the reason that on the present level of prices for cloths there is little promise that consumers will take the capacity product of the cotton mills of the country. Reduced costs of production seem inevitable, and the first move must of necessity come through raw material and wages.

That a great error was made in over-valuing many New England mills for the purpose of taxation for local improvements is now generally admitted. Very recently, the assessors at Fall River cut down corporation valuations, and by raising the rate they brought home to the general taxpayers the fact that municipal expenditures were going on at too fast a clip, and were handicapping the competitive power of the principal industry. Many mill tax cases are still being fought through the courts and abatements are believed to be certain. These tax fights are costing both sides a great deal of money, running in fact into the hundreds of thousands of dollars.

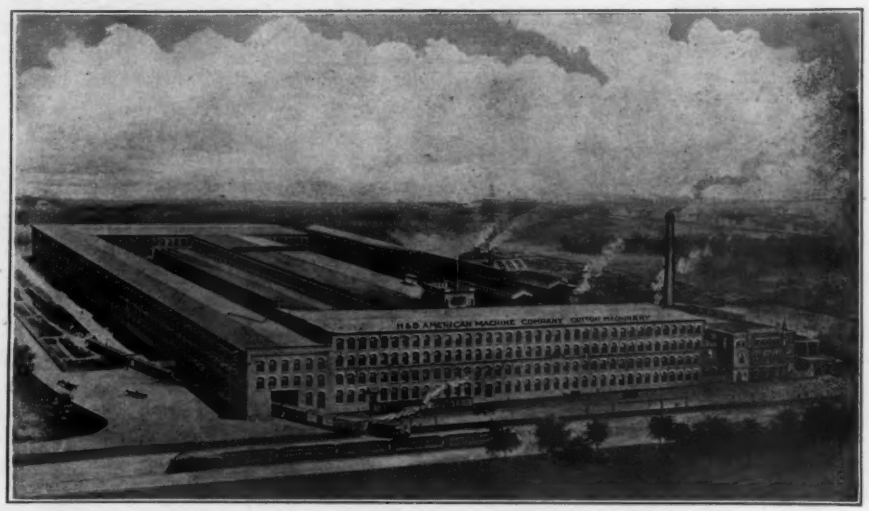
The fundamental cause of excessive taxation was the wartime dividends of mills and the common belief that wartime inflation was something that would last. It was the same cause that led to the purchase of the B. B. & R. Knight properties in Rhode Island at a price that would not have been high if the then existing cloth and general values were to be maintained. The shrinkage came suddenly in 1920, and has been going on since, intensified of course by the lack of profit margin between cotton and cloth. Very recently, the necessity for a reorganization of the properties was made known in a public announcement.

Conservative bankers and manufacturers have known for three years that a reorganization of the capital of the Consolidated Textile Co. would have to come, and because of the preparations made for it, the announcement caused no market shock. The Rhode Island mills of the company had either been closed or operated on short time and the stocks of goods liquidated. There are yet many details of the reorganization to be completed but the general view is that it will be carried through and that eventually the re-equipment of the Knight properties will be continued. Rhode Island is still struggling against the effort of labor-unionists to impose a 48-hour law on the state. If that struggle ends in failure for the mills it will undoubtedly change the prospect for the resuscitation of these concerns.

The strain of the past months has begun to tell in the passing of mill dividends all through New England. Very recently it developed that the Dwight mills of Chicopee were overburdened with debt and a reorganization and a change of management resulted. In some other places similar changes are pending.

It is now pretty well recognized throughout this section as well as throughout the country, that high cotton was not the sole cause for the textile depression. The American Woolen Company passed a quarterly dividend on its com-

COTTON MACHINERY



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mon stock because it did not earn it. It could not sell its spring products offered a month ago, nor could it keep more than half its plant occupied on fall products. Some of the large silk and knit goods mills were similarly affected.

The real cause for the depression was that goods were in larger supply than consumers required at the prices charged, and those prices were kept high by excessive costs of production. There had been a substantial contraction in purchasing power or desire, due to many causes, including low prices for farm products, and a great deal of extravagant expenditure for autos, radios, etc. All the while, high rents, high fuel costs, and high living costs, were having their normal effect of lessening the available money applicable to dry goods.

While New England manufacturers are already securing a little larger business on cotton goods and while it is evident that orders are slowly increasing and necessitating a little larger production, there is no gainsaying the fact that belief in a great period of prosperity being at hand, is not general. The fair harvests have increased the demand for goods for fall and winter use and have been spread sufficiently to relieve the congestion of buying in the farming districts. On the other hand, the great steel industry is but 60 per cent occupied, building operations are going along on a more cautious scale, high rents, high fuel costs, and high living costs still prevail, and unemployment is widespread.

Insofar as cotton goods supply is concerned, it is clear that the great curtailment of the past several months has lessened the stocks in mill hands and probably in many retail and jobbing hands. But a great part of this supply was an over-supply, and in distributing it, mills and merchants took losses, and the public is going to profit for some time by the lower prices that were necessary in liquidating the surplus. The existence of these lower prices in distributing channels, is certain to delay an uplift in prices in keeping with the costs of production. It follows that it is going to be necessary to reduce production costs, to meet the prices buyers want to pay, and that process is not going to be sudden.

Ultimately, the great curtailment of production must tell as it has reduced the supply of many goods. What the trade is now awaiting is the development of a broader demand that will take care of many of the staple products that have been moving slowly for months. Percales, ginghams, bleached cottons, and many of the brown goods are very low in price, yet the demand for them is insufficient thus far to take care of more than two-thirds of the capacity production.

Cotton has undergone such a severe decline of late that confidence in values for the longer future has been shaken. Cotton at 22 cents a pound is not high cotton in relation to cost and it is certainly not high in relation to the current prices for goods and the current rate of wages in textile channels, notably in garment making industries.

But manufacturers feel that the price argument of scarcity, in relation to cotton, no longer exists. With a yield approximately greater by 30 per cent than a year ago, and with a carry-over substantially as large as last year, there is justification for looking for lower prices than have prevailed for a couple of years. It is certain, so far as New England is concerned, that curtailment of cotton consumption in factories will continue prominent for another month at least, and it is also clear that until there is a very great increase in the profit margin, manufacturers are not going to buy cotton to be stored.

Cotton Comment.

BY H. AND B. BEER.

New Orleans, September 11, 1924.

Compared with one month ago the market has declined more than 3 cents per pound, or more than $15 per bale, due to returns to the government indicating a larger crop than was indicated last month—12,787,000 bales vs. 12,351,000 one month ago, which compares with last year's production of 10,128,000 bales. Linters not included.

There was no abatement in the drouth conditions west of the Mississippi River, especially in Texas, except where relief was obtained in scattered localities in the way of local rains, principally in west and northwest Texas, but generally favorable weather prevailed to the east of the river.

The larger crop prospects, about 2,659,000 bales larger than last year's yield, has been made possible by the absence of any damage of consequence by weevil or worms, a condition that has not prevailed for the past several years, due to the light hibernation of weevil last winter, the result of the severe cold, and because of the hot, dry summer preventing propagation of insects, particularly of the weevil.

Returns to the government, as of September 1st, averaged the condition of the crop at 59.3 vs. 54.1 on August 25th last year, and ginnings to the same date, September 1st, were 958,204 bales vs. 1,142,660 bales last year, of which Texas furnished 630,842 bales against 1,089,530.

Notwithstanding the much lower prices established, trade buying has not been urgent, especially from domestic spinners, and unless unfavorable wet weather sets in, which would likely lower the grade of the crop, which so far has been running high, or unless the trade demand improves, lower prices still are not at all unlikely, as receipts promise to assume large proportions since ginning is now in full swing and because of there being so much cotton open in the fields, which is being gathered as fast as possible.

According to government returns, the indicated crop by states, as of September 1st, compared with last year's final results, is as follows: Virginia, 41,000 bales vs. 50,000; North Carolina, 828,000 vs. 1,017,000; South Carolina, 767,000 vs. 769,000; Georgia, 1,209,000 vs. 588,000; Florida, 27,000 vs. 12,000; Alabama, 948,000 vs. 587,000; Mississippi, 1,033,000 vs. 603,000; Louisiana, 371,000 vs. 363,000; Texas, 4,284,000 vs. 4,340,000; Arkansas, 1,109,000 vs. 620,000; Tennessee, 421,000 vs. 225,000; Missouri, 228,000 vs. 126,000; Oklahoma, 1,289,000 vs. 655,000; California, 61,000 vs. 54,000; Arizona, 89,000 vs. 78,000; New Mexico, 65,000 vs. 36,000; all others 17,000 vs. none; U. S., 12,787,000 vs. 10,128,000.

Private cable advices from Bombay estimate India's crop this year at about 4,800,000 bales of 500 pounds gross weight, against about 4,219,000 bales last year, but as planting in India is only nearing completion, estimates at this time are rather premature.

(*Continued on page* 1281.)

GLENN-LOWRY Y. M. C. A.

WHITMIRE, S. C.

Brunswick-Balke-Collender Co.,
35 South Forsyth St.,
Atlanta, Ga.

July 25, 1924.

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The equipment that we have has given us entire satisfaction and after about five years use is in A number one condition. We feel free in saying that we could recommend your equipment to any one who desires the very best of equipment and service.

Yours truly,
Mgr. Y. M. C. A.

Community Building, Glenn-Lowry Manufacturing Company, Whitmire, S. C.

A corner of the billiard room in this building.

The bowling equipment.

Fostering labor co-operation

A RECREATION centre in industrial plants brings greater co-operation between employers and employees. There is an enhanced employee good-will, a higher efficiency, better co-operation, and a noticeable reduction in labor turnover.

As evidenced by the letter and views illustrated above, the Glenn-Lowry Manufacturing Company, of Whitmire, South Carolina, has found its billiard and bowling equipment most beneficial in establishing contact with its employees and advancing the spirit of co-operation.

As makers of the world's finest billiard and bowling equipment, the Brunswick-Balke-Collender Company has furnished the equipment used in the country's most successful industrial welfare associations. The knowledge and experience thus gained is at the disposal of any one interested in this means of effecting a closer relationship between employer and employee.

The BRUNSWICK-BALKE-COLLENDER *Company*

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NOTES ABOUT MEN YOU KNOW OR KNOW ABOUT

GEORGE A. TOBEY, formerly of Athens, Ga., it is announced, has been appointed superintendent and general manager of Morven Cotton Mills, Inc., Durham, N. C. J. H. Laurens has recently accepted the position as overseer of weaving at this mill and W. A. West, Sr., is in charge of the cloth room.

W. R. BARNETTE, formerly at Converse, S. C., has been made general overseer of carding at the Hermitage Mills, Camden, S. C., and H. P. Cannon is night overseer at the same mills. Mr. Cannon also was formerly at Converse.

L. A. HAMMER has been made assistant superintendent at the Tucapau Mills, Tucapau, S. C. E. A. Hill is general superintendent.

CHARLES L. WINN has joined the organization of the Mossberg Pressed Steel Corporation, Attleboro, Mass., as sales executive. Mr. Winn is an alumnus of the Lowell Textile School, and has had a practical training in the industry. He will supervise the business of the company in the textile industry of New England.

JOHN L. ROBINSON recently resigned as superintendent of the Minneola Manufacturing Co., Gibsonville, N. C., and was succeeded by John T. Roundtree, who was promoted to the position.

A. W. ROPER has become overseer of carding at the Bradley Manufacturing Company, Columbus, Ga. He was formerly assistant superintendent at the Lullwater Mfg. Company, Thomson, Ga.

C. W. MCSWAIN has resigned as textile director of the Parker school district at Greenville, S. C., to become associated with the southern plant of the Steel Heddle Manufacturing Company, at Greenville, S. C. Mr. McSwain was formerly an instructor at the textile department of Clemson A. & M. College, at Clemson, S. C.

W. T. DAVIS has become overseer of carding, spinning, spooling and warping at the El Paso (Texas) Cotton Mills. He was formerly at Greenwood, S. C.

F. W. HOWE, vice-president of the Crompton & Knowles Loom Works, Worcester, Mass., recently returned from a seven weeks' trip to England and France, on which he was accompanied by his wife and two sons, who remained in Switzerland for a month's visit.

M. H. MALDEN is the overseer of the cloth room at the Balfour (N. C.) Mills.

H. H. HOLCOMBE recently resigned his position as overseer of spinning at the Avondale Mills, Birmingham, Ala., and will devote his time to the manufacture and sale of the Holcombe bunch builder of which he is the inventor.

L. H. HAYNES has become night overseer of carding at the Lockmore Cotton Mills, York, S. C., succeeding L. F. Perkins, resigned.

W. T. NORTON is the overseer of carding and spinning at the Balfour (N. C.) Mills.

H. E. STILL has become overseer of carding at the Ninety-Six (S. C.) Cotton Mills. He formerly held a similar position at the Addison Mills, Edgefield, S. C.

JOSEPH L. GADBOIS, who recently went to the Seneca Knitting Mills, Inc., Seneca Falls, N. Y., in charge of the knitting department, has returned to the House of Byer, Cambridge, Mass., where he formerly was located.

J. A. GARDNER has been promoted to the position of overseer of the silk department at the Dunean Mills, Greenville, S. C.

J. C. COSTNER has become overseer of the cloth room of the Chadwick-Hoskins Mill No. 2, Charlotte, N. C.

JAMES B. MCLAUGHLIN has resigned as overseer of the cloth room at the Beaumont Mills, Spartanburg, S. C., to become overseer of finishing and shipping at the Dacotah Mills, Lexington, N. C.

JOHN T. HILTON, a graduate of Bradford-Durfee Textile School, of Fall River, has been appointed associate professor of carding and spinning in the textile department of the State College, at Raleigh, N. C., succeeding P. W. Price, who continues with the college in another capacity. W. E. Shinn, a 1924 graduate of the N. C. State College, has succeeded L. E. Lane, resigned, as instructor in carding and spinning.

THOMAS FULLER, JR., who was formerly connected with the Charlotte office of the Westinghouse Electric & Manufacturing Company, but who for the past ten years has been in the Atlanta office, has returned to the Charlotte office, of which he will be the manager.

D. C. JOLLEY has resigned as night overseer of carding at the Greenwood Cotton Mills, Greenwood, S. C., and has become overseer of carding at the Addison Mills, Edgefield, S. C.

ROBERT HUGHES has become associated with the Detroit Graphite Company in the capacity of sales representative. His headquarters will be at Macon, Georgia, and he will travel the territory in which the company was represented by the late George W. Cureton.

C. L. BUSBEE has been promoted from second hand to overseer of spinning at the Seminole Mills, Clearwater, S. C., succeeding Q. E. Britt.

OSCAR ELSAS, president of the Fulton Bag & Cotton Mills, Atlanta, Ga., died suddenly in Boston, Mass., on September 19th, following a brief illness that necessitated two surgical operations. Mr. Elsas was one of the foremost figures in southern textile circles. He was born in Atlanta in 1871, the eldest son of Jacob Elsas, founder of the Fulton Bag & Cotton Mills. He was educated in Atlanta and was graduated from the Georgia School of Technology as a member of the first class graduated from that institution. He began work at the Fulton mills, rising through the different departments to the presidency, upon his faher's retirement, some 15 years ago. Mr. Elsas' death came as a sudden and distinct shock to his many friends in the industry, and marked the passing of one of the foremost textile men in the country.

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—trademark transfers
—hosiery packing
—dry goods labels
—hang tickets, etc.

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"You already furnish us with transfers for trademarking our hosiery. Why don't you make lithographed hosiery packing, too? Then you'd have a really complete service for us, for we could get out trademarking and packing requirements all from the same house."

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The demands for this service have grown by such leaps and bounds that already an entire floor in the new Kaumagraph Building is used exclusively for hosiery packing, dry goods labels, hang tickets, etc.

Especially to present users of Kaumagraph Trademark Transfers, our lithographic department has an important story—a story beyond the common run of quality and price. We urge you to write or phone our nearest office for full information.

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—and trademark your textiles, silks, hosiery, etc., with

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How Much is Spool Breakage Costing You?

ARE you continually having to replace spools as a result of broken heads due to their splintering or coming off?

When things like this happen to spools they are a dead loss—and the yarn, worth several times the amount of the spool, is wasted, for the salvage value of such yarn is very little.

U S Fibre Head Spools eliminate this yarn wastage, and the time and danger of stopping creels—besides that, they protect employees from possible injuries from broken or splintered heads that occur to wooden spools.

The round bevelled head bushing and its method of application to fibre head spools was originated by the U S B & S Co., without this bevelled head bushing, fibre head spools would be a failure.

We do NOT guarantee that fibre head spools cannot be broken, nor do we guarantee they will not crack, warp or chip—but we DO guarantee that our method of applying the fibre head to the wooden barrel is unexcelled, as we take extra precautions in their manufacture, to uphold the same high standard of quality that has made our many other U S Products famous.

If you have never tried U S Fibre Head Spools, we ask that you write for samples and give them a thorough trial. That is the best way to convince yourself of their superior quality.

U S BOBBIN & SHUTTLE Co.

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Eight Factories — Providence R.I.

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BEAMS	SPOOLS	SPEEDERS	ROLLS
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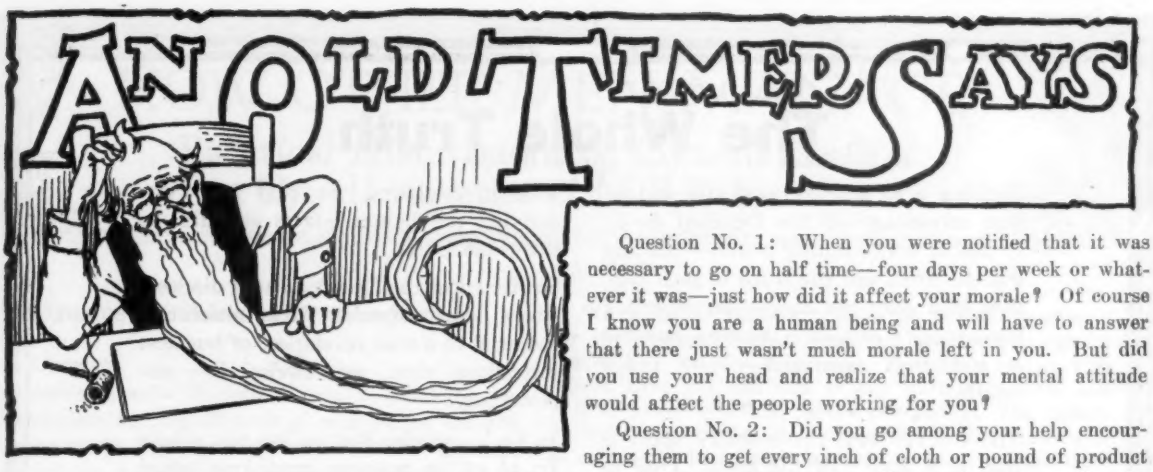
BOBBINS	Warper	FLAX SPINNING	Drawing
SHUTTLES	Twister	TWISTERS	Winder
SKEWERS	Jack	TRIPTODS	
	Silk	QUILLS	ETC.
	Belting		



Gosh! We have had our share of this "curtailing" business this year, haven't we?

Well, you know, I don't believe a man can have an experience of any kind but what he can derive some benefit from it if he will give it the thought that he should.

We heard a great deal about the word "morale" during the war, and now most of us have had a chance to realize its full meaning.

Of course, many overseers and superintendents have been unable to make a true study of how the morale of their operatives was affected by curtailment and hard times in general, because they themselves were affected as much and in many cases more than the operatives.

Really there is some excuse, probably, for the operatives to be affected as they have been, because they are not supposed to have the broadness of vision to enable them to reason things out like an overseer or superintendent can, but I do claim that there is no excuse whatever for an intelligent overseer or superintendent to get the "blues," lose his "pep," and get run down at the heels generally, right at a time when all of his operatives are affected in the same way.

It is a generally conceded fact that when the mill has to curtail production, it not only loses the production for the hours it curtails, but the percentage of production per hour it operates is much less than when operating on full time.

I say it is generally taken for granted that this condition must prevail, but what I want to know is *why* should it be so?

Doesn't it seem reasonable to suppose that when an operative's time is cut 50 per cent or to three days per week instead of six, then he would put forth every effort to get more production out of his machines per hour if he possibly could? The very fact that he actually gets less production per hour when he works three days per week than he does when he works six days seems on first thought to be a pretty good argument against reducing the working week to 48 hours instead of 55.

I want you, my brother overseers and superintendents, to look back now to the curtailment period we have just gone through, and ask yourself a few personal questions. Of course, I am not expecting you to tell "Old Timer" what your answers are, but answer them honestly to yourselves and see if you can't profit by the experience.

Question No. 1: When you were notified that it was necessary to go on half time—four days per week or whatever it was—just how did it affect your morale? Of course I know you are a human being and will have to answer that there just wasn't much morale left in you. But did you use your head and realize that your mental attitude would affect the people working for you?

Question No. 2: Did you go among your help encouraging them to get every inch of cloth or pound of product out of their machines in an effort to balance up for the curtailment? Did you take the opportunity of trying to impress upon them the necessity of learning how to save part of their earnings when they did get back on full time? Any overseer or superintendent knows that his best help are the ones who try to save some of their earnings. Why didn't you take the opportunity, then, of increasing your percentage of "best help"?

Question No. 3: Did you neglect your usual efforts at discipline until your seconds or bad work went out of the bounds of reason before you realized it?

Question No. 4: Did you take the opportunity of impressing upon your section men the necessity for the economical use of all supplies? Of course this should be done in good times as well as in hard times—but it is a fact that an overseer or a superintendent can make a better argument about such things during hard times and the thought is that if you can form the habit, so to speak, that habit will be retained, partly at least, when prosperous times come back.

There is no need for me to take up space with more questions. I have given you the thought so the thing for you to do, if you really want to help yourself, is to fit your own questions to yourself.

You know what they are much better than I can enumerate them to fit your individual case. You remember how "Old Timer" pointed out to you in quite a lengthy article that it is not the things *that we do not know how to do* that hold us back from being bigger overseers and superintendents, but *it is the things that we actually know how to do and do not do.*

Do you remember that article about

"Would You Hire Yourself for Your Job?"

Well, I think it would be a darn good idea if you would look it up and read it again.

Experience gained during any kind of a hard time such as curtailment, bad running work, shortage of help or anything else, *should* make you a better overseer or superintendent when the revival comes or when the next hard time comes.

The best or strongest or most efficient overseer or superintendent is not the one who believes that things will always develop to his advantage—but the one who will persist in the belief that he is capable of *making* things come out right, and then keeps persistently, everlastingly, at it until they do.

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Figuring the Colors in Heather Yarn.

Editor Cotton:

We desire to make 18s heather yarn, as follows: Run on intermediate, one end .50 hank of color *B*, one end 1.00 hank color *O*. This gives a stripe of 1.35 hank. Now run one end of this stripe on the speeder with one end of 1.00 hank color *N*, making 4.00 hank roving. This stripe is run on the spinning with one end of 4.00 hank color *B*. We wish to make 5,750 pounds of this heather. What per cent of each color will it take? N. O. B. (N. C.)

Clothing Cards.

Editor Cotton:

You have been having some discussion in "How Other Men Manage" on clothing cards. This is an important point, and in the thought of continuing this discussion to bring out as much information as possible, the following remarks on the subject, written some time ago, are submitted. To my knowledge they have never been published and they may provoke some further opinions on the subject.

In clothing a new card there are several points that have to be looked after before putting the clothing on. Some of these must be attended to in the erection of the card; such as seeing that all parts are level and in line, that the cylinder and doffer are running true, and that they have no high or low places in them. If such be the case they must be ground with a drum grinder until the surface is as smooth as possible. If the card that is to be reclothed is an old one, make sure that all parts are level and in line, and that the revolving members are balanced. See that the cylinder and doffer are free from rust, and that their surfaces are as smooth as possible. All the pegs should fit snugly in their holes, and be flush with the surface of the cylinder. If any loose ones are found they should be removed and new ones put in their places. Marks should be made on the edge of the cylinder where the rows of pegs occur, so that in tacking the fillet the pegs can be easily found. A small stick should also be taken (which is the width of the cylinder) with a piece of clothing tacked on each end, and the center of each peg marked on the stick, for by this means the pegs can easily be found when the clothing is being tacked on.

Of course, like all other things that are on the market, there are many different grades and qualities of card clothing. It should, however, be of the very best material obtainable, as cheap card clothing has a short life, full of trouble. Cheap clothing, too, causes frequent buying and gives bad results through the entire plant. It has also been found by experience that cheap clothing not only wears out first, but has not the qualities or capability of producing the best of results, which is the most essential thing that any carder can desire. Clothing containing rubber has been used to some extent, but this is even worse than a low grade clothing of cotton and wool fiber. Its inferiority is partially due to the fact that rubber soon loses its elasticity and is more or less affected by the heat. This is especially true in southern or hot climates. So in card clothing, nothing but the best should be used, not merely from a theoretical standpoint but most assuredly from a practical standpoint, backed by years of the experience of many mill men.

There is no question that card clothing should be put on only by an expert in the business; that is, one who will exercise the proper judgment, and will look after the card carefully to see that everything is all right before putting the clothing on. Prior to putting the new clothing on, it should be opened loosely in the room in which it is intended to work, and remain in that state for about 24 hours before using. This is done to let it become of the same temperature as that of the room. This temperature is about 80 or 90 degrees, and should be kept constant at all times while dealing with the clothing, especially while drawing on the fillet. The backs of the clothing should be rubbed freely in order to push all of the teeth into their proper positions.

Cards may be clothed with the clothing machine either at the front or back of the card. Whichever position happens to be the most convenient to the clothier. With the knee pointing in the proper direction the clothing is started through the machine and tacked to the left side of the cylinder without cutting any taper, as this is the first drawing. We then proceed to draw the fillet on at a pressure of 250 to 300 pounds, and, when the other side is reached, the clothing is secured by tacking. It is then allowed to stand on the card in this way for twelve hours in order to take out the stretch.

After the clothing has remained on the cylinder the specified time, it is then removed in preparation for the final drawing. This preparation consists mainly of cutting the tail-end, or the taper.

Referring to Figure 1, the starting tail-end is cut in the following manner; as shown in the figure the clothing has six rows of teeth. Starting from end *A*, we mark off six spaces, 20 inches long, namely: x1, x2, x3, x4, x5 and x6. Then we pull out a few teeth at the mark 2 in order that

We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishing plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsibl for any statements of opinion or fact which may appear in this department unless so endorsed. This department is open to all.

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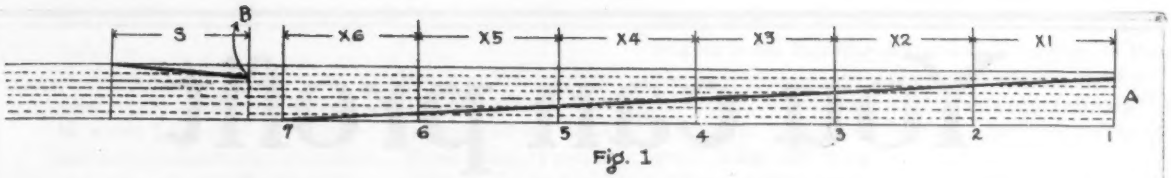

Fig. 1

we may cut a taper in cutting from mark 1 to 2 and also prevent the formation of a shoulder. Then we pull out a few teeth at the third mark and cut from 2 to 3 as shown along the line in the sketch. This is continued as shown by the diagram until we reach the mark 7. The portion *S* is 20 inches long, and is found by tacking end *A* and drawing the clothing around one revolution, marking where to start shoulder *B*. It does not always come in the position shown in the figure. This method of cutting tapers is usually known as the inside taper method.

Having the tail end cut we now proceed to draw the fillet on. The first lap is usually tacked all the way around in order that it may withstand the pressure that is put upon it. We now continue to draw the clothing on at a tension of 350 to 375 pounds. Making sure that the traverse of the machine is right, we operate the machine very slowly and cautiously. The fillet should be laid closely, but not crowded or turned on edge any more than is necessary. A good method of having the fillet lie closely together is to lay a block of wood against the fillet and hammer against it as it goes on the cylinder.

If, during winding, the clothing machine should happen to get behind, it should be reset in order to prevent the clothing from riding. When the last lap is reached this taper is cut according to the space it has to fill and tacked down. The card should then be allowed to stand for a few hours with the clothing tacked only on the first and last laps. This is done in order that the clothing may arrange itself to its position, and not cause what are commonly called "blisters." These are caused by the fillet being tacked immediately after it has been put on, without giving time for it to become set to its position. When ready to tack the fillet, we lay a small stick which has the peg marks on it horizontally across the cylinder. At one of the peg marks on the edge, with a small punch to find the peg, we tack the clothing to the cylinder, and if a peg happens not to come in the center of the strip of clothing, it is best to skip it rather than have a hole in the edge, which may weaken it.

If the doffer is to be clothed, practically the same principles apply to it that apply to the cylinder. The main difference being in the fact that the doffer clothing is drawn on at a tension of 200 to 250 instead of 300 to 350.

After the card is clothed our next step is to grind it. This is something that can be learned only from experience, and any superintendent who is paying a good card grinder well to keep his cards in the proper condition, is by no means wasting the company's money. Any superintendent who desires the best results from his cards must keep them in the proper condition. The only way to do this is to know a good card man when you see him, and pay him well to keep him because if you do not some other "super" is going to nab him. In order to get the best results from a card the teeth must not be ground to make them sharp but to keep them sharp. Any that have become mashed or jammed should be worked back into place as well as it can be done. Before grinding, back the doffer off from the cylinder, remove all waste and fly from under the card. Reverse the direction of rotation of the cylinder, and make sure that all other revolving parts have the right direction of rotation. The cylinder and doffer should be ground about once every twenty days, and the flats about once every thirty days, depending largely upon the kind of work that is being put out.

The weight of grinding should be regulated according to the condition of the teeth. Never grind too heavily. Ordinarily the grinding should begin comparatively light with a gradual increase. Use a traverse grinder on the cylinder and doffer and a drum grinder on the flats. Each has its advantage and its disadvantages, but on the cylinder and doffer the traverse gives the best results.

Card setting is something which cannot be done by any exact rule, but it is governed to a great extent by the length of the staple in the cotton that is being used and the strength of the yarn produced. The following settings, however, may be taken as a good average:

Doffer to cylinder	7
Flats to cylinder	Tight 10 to a loose 10
Licker-in to cylinder	10
Feed plate to licker-in	12
Bottom mote knife to licker	10
Back knife plate to cylinder	17 lower, 32 upper
Front knife plate to cylinder	17 lower, 32 upper
Cylinder screens ¼ inch at point next to doffer end and 34 gauge at point nearest licker-in. Licker-in screens ¼ inch from licker at a point nearest feed plate and a 34 gauge nearest cylinder.	
Doffer comb to doffer	17
Stripper to flats	17

These settings are usually made with a small steel gauge two, and in some cases, three kinds are used. One is about nine inches long and 1¾ inches wide, and contains four leaves pivoted together. These leaves are made of thin sheet steel and are usually 5, 7 and 10/1000 thick, respectively. The second gauge is used mostly for flat setting and consists of a strip of steel about 1½ inches long and 1¼ inches wide, bent at right angles, about ½ inch from one end, having a handle attached to the other end. The end that is used for setting is usually 12, 10 or 8/1000 of an inch thick. The third gauge that is sometimes used consists of a quadrant semi-circle, or even a disc mounted on a shaft, and is used in setting the top of the cylinder screen to the cylinder and licker-in. The curvature of the gauge corresponds to the curvature of the licker, with the setting allowed. By this method we are sure of the settings of the licker, which means better work from the card.

In the operation of a card too much stress cannot be laid upon the fact that herein lies the foundation for good or bad running work. The results of the work of the card will show up in the subsequent processes, and if bad, they will decrease the profits of the mill. It is nothing but good common sense that a mill is economizing when a man

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is at the head of the card room who understands his business.

Some of the things to be watched in order to obtain good results are that the surface speed of the cylinder should be about 2,100 feet per minute; the speed of the doffer should be about 95 feet per minute. Cards doing 14 pounds per hour should be stripped every 3½ hours, and it is owing to whether or not the strippings are to be worked back with waste as to whether or not the feed should be cut off. If the strippings are to be worked back, some consider it unnecessary to stop the feed, but a good majority of mills do this when stripping. The licker-in must be in the best of condition and the teeth must not be dull. If they are this should be remedied at once. Some attention should be paid to the oiling of a card as a bearing running without oil soon wears and gets out of line. All the teeth should be kept straightened and in good condition. Never card too heavy. To overwork a card lowers the quality of the work done and has a decided effect upon the finished product.

Stripping is another important thing to which, in some cases, too little attention is paid. In addition to the ordinary roller-stripper we have one that is covered, having only a portion open to work on the cylinder. A pipe, connected to a suction fan, which is operated by the same belt that drives the stripper, is fastened to this shield over the roller, and when stripping, all of the fly is sucked by this fan into the box. This is a great improvement over the old method, and is just as easily operated.

The roller should be kept in the best of condition and never be set too low in the teeth, as it will cause the clothing to get slack. Set it so that it will do good work but not so that it will injure the clothing. The card tender should not allow lumps of laps to run in and jam the licker-in and cylinder. Doff the cans before they are full enough to stretch the sliver, and if feed has been cut off during stripping, do not put an end up after stripping until the cylinder has had time to fill up. H. E. R. (Ga.)

Keeping Wegihts.

Editor Cotton:

I read "Bab's" description of team work in keeping even numbers, in the July issue, in answer to "L. J. S.'s" remarks in the May issue. "Should draft gears be changed in the spinning to keep numbers?" is asked. The gears are not changed in the spinning to keep numbers, but to make the finished product right—cloth or yarns as the case may be. The carder should keep the weights, and there should be no changes made to rectify anything unless the carder is acquainted with the change in the spinning room. It is liable to get him mixed up in his intentions, and weights. But he should have a finer change than ½ tooth; it's an easy matter to get crown gears cut which usually run in numbers up like 98, 99, 100, 101 and sometimes 102 teeth in them, which makes a much finer change in the weights than ½ tooth.

Now in regard to letting the numbers run away with a fellow, it's this way. I have seen the numbers run along smoothly for days, and all at once a dry and windy day comes and the numbers go light all through the mill within three or four hours—the beams, yarn and cloth weights seem to change at the same time. When this happens, what should be done. Let them come right, change, or pad the weights in the finishing department, or change to the right side and lay aside the weights that are not right and mix them in as the weights come that do weigh correctly? It all happens in the best of regulated families, and is no discredit to any mill man.

Same way on heavy weights. When you've run along for days and weeks with dry weather and have good weights until it sets in for heavy wet days and the cotton seems to absorb the moisture at the same time, when you have done what you thought was right to keep the proper humidity and moisture in the cotton, it doesn't seem enough. Now we have humidifiers all over the room, but the control acts only according to the heads nearest them, regardless of what might happen elsewhere in the room. To make them act correctly, I sometimes think there should be a control on each humidifier head, to govern each space in the department, but we haven't got it, so we have to take the average and make the best of it that we can.

And as to the variation of the numbers, that should not be more than 5 or 7½ per cent of the number, either in the spinning sizing or the beam averages. One good way for the carder to keep his weights is to keep track of some special place. If he is making cloth let him watch the beam weights and be governed accordingly. Then if he is making a special filling for cloth and the cloth weights get away too far, he can help the spinner by changing on the filling yarn, both understanding what each has done and they can determine when there has been enough changing. You can say what you please about keeping weights, but both the carder and the spinner will be called upon at times to help keep the weights right in the finishing department, and this will be the case until we get to melting the cotton and moulding it in moulds. Contributer No. 14.

Fast Green and Black on Cotton.

Editor Cotton:

It would be of great value to me if some reader were to tell through "How Other Men Manage" some ways for dyeing a fast green and a black (fast) on cotton. I want ideas regarding natural dyes, not anilines, as our folks in the office want natural colors. A. T. (Ohio)

Editor Cotton:

Replying to "A. T.," I would say that for dyeing a fast green on cotton cloth with the natural dyestuffs into colors suitable for umbrellas and other materials in which fastness of shade is a great desideratum, the cotton must first be dyed blue in the indigo blue vat, rinsed and soured and again rinsed. The goods are then entered into ten pails of boiling water and three pounds of alum (or other alumina mordants) for ten minutes. They are then rinsed in cold water and entered into a cool bath of weld liquor until green enough (for about one-half an hour). Rinsing and starching in a blue liquor completes the process.

Where a high standard of fastness is not required the goods may be dyed blue with Prussian blue either before *or after* and then dyed with quercitron and alum, either with or without starch.

With regard to fast black on cotton, there are many ways of dyeing this fast with iron and woods.

In the first place, the cotton goods may be padded with

pyrolignite of iron (black iron liquor) evenly upon a padding machine at about 7 degrees Tw., then dried evenly. Then run through cold lime water, then rinsed and dyed in a bath composed of logwood and bark (quercitron or fustic) or all logwood if wanted very blue. It is essential that the iron liquor be free from free sulphuric acid, or else the goods will be tendered, for this reason keep old hoop iron in the iron liquor.

In the second place the cotton may be dyed first an iron buff with pyrolignite or nitrate of iron and soda ash and then dyed with logwood or logwood and fustic.

In the third place, the cotton may be dyed as follows, which is the best of all:

The cotton is steeped overnight in a tannin bath; sumac may be used for this though any tannin will answer, i. e., tannic acid, sumac, galls, etc.; in this case the liquor must be boiling when entered and left, with the goods in it, to cool until morning. This is followed in the morning by a passage through an iron mordant, a pyrolignite of iron by preference. Then by a treatment with cold lime or chalk, and rinsed. The goods are finally dyed with logwood or logwood and fustic or bark and rinsed.

In some cases, the dyers use chalk or lime water immediately after steeping in the tannin liquors.

A chrome black is sometimes used, though I don't personally approve of a chrome black; nearly all chrome blacks, although all right at first, turn brown in the cases, or with age, and I do not approve of them in connection with logwood. For chrome fast black we proceed as follows:

Let lie in a hot bath (to start) all night containing 10 or 15 per cent of logwood extract, working it for some time. In the morning wring the cotton (or squeeze) work the cotton for half an hour in a cold bath containing three to four per cent of bichromate of soda and three to four per cent of sulphate of copper. It is then taken to the logwood bath and with or without the addition of further logwood (or logwood and bark) to which about three per cent of soda ash has been added. If necessary the black may be "saddened" by adding some ferrous sulphate. I would say that the dyestuff concern—I have forgotten which—furnishes this chromium compound for raw stock, and I believe it is considered very good, but I, myself, give all chrome blacks a wide berth, for the reasons given.

W. B. (Maine)

Is a College Education Essential to Success

EDITOR COTTON:

This subject for debate in many of our national magazines occurs quite frequently. Also, in the recent issues of COTTON there have been several discussions on "College Men and Cotton Mills."

At times there seems to be bitter feeling on the part of the non-college men against college men. In some cases there may be reasons for this attitude. A case to my knowledge is where college men coming right from college are placed in the mill, after an apprenticeship course covering two years, are made superintendents. This practice is unfair and is not practicable.

It is often said a man with a college education can advance much faster than a non-college man. This is true in some cases. A cotton mill should welcome the college man and he should be given any help needed, provided he is of the right sort and willing to start on the scratch with the non-college men. I do not envy the college man.

We all believe in our colleges; we would all like to have a college education; but it is not absolutely essential to success in life. A college education is a great advantage, but any of us who have missed a college education need not worry. Our chances in life are big enough to overcome any handicap if we have got the stuff in us, and use our spare time in improving ourselves.

We have often heard men say, "What's the use? I didn't get the education. I've got to have some fun and recreation after working all day," and turn to the sporting page. These same men, upon seeing the constant success of a self-made man who has sacrificed many things to attain success, will say, "Oh, he had a lot of luck and pull." "Old-Timer" puts it well when he says, "Success attends him who determines to persevere."

The cotton mills today need leadership and method to secure cooperation throughout the mill. Cotton manufacturing is a cooperative matter and nothing much will be accomplished in it unless everybody works together for a common result. The mills need leaders—whether they be college men or not.

Anyone who is reading and studying his copies of COTTON regularly is getting a very good education.

Optimistic (Mass.)

Are There Standards for the Weighting of Rolls in Spinning?

EDITOR COTTON:

I am very much interested in the weighting of rolls on spinning frames, making different numbers of yarn, and would appreciate it very much if some of COTTON'S readers will tell me if there are any standards used in this connection.

W. S. (MASS.)

An Example of Carding Practice.

EDITOR COTTON:

In the August issue of COTTON appeared an article by R. A. Soniaman on "Paging the Card," in which he asks a few questions which I shall answer from my own viewpoint and experience.

The object of the card should be to disentangle the cotton fibers, viz., the starting of parallelization; to remove the smaller and lighter impurities, and to reduce the cotton from a lap form to a sliver form. The cotton should be presented to the card free from all the heavier impurities. To do this the cotton must be well opened. A certain mill has a bale-breaker, an opener with a porcupine beater, and a breaker and finisher picker, each with a two-blade beater, and this lay-out seems to clean the cotton very well.

This mill has from 8 to 10 per cent waste taken out on the cards. A 10½-ounce lap is used on Sakellarides cotton and a 12½-ounce lap on the Egyptian and American cottons, making a 38-grain sliver on the Sakellarides and a 48-grain sliver on the Egyptian and American. In a room of 148 cards, eight cards per day are sized by an employee who sizes throughout the card room. Records are kept of all the sizings, which are taken in two-yard lengths. A variation of more than three per cent should be looked into

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Is a soluble soap which dissolves fats and oils, particularly unsaponifiable ones. It has the same property of quick and thorough wetting out as the other products. It unites in one reagent the qualities of a potash soap, a wetting compound and a cleansing medium.

POTT'S EMULSIFIER

A compound that can be mixed with any of the oils used in textile mills, such as wool oil, lubricating oils, loom oils, and a mixture of 25% Pott's Emulsifier with the oil in question will produce a compound which can be washed out in clean water even though the material has been stored for a long time. It is also useful for removing spots of various kinds from materials.

ISOMERPIN

Chiefly recommended for its wetting out properties on all kinds of fabrics and as an assistant in bleaching and dyeing.

NEOMERPIN

An assistant in the reduction and dyeing or printing of vat colors. The wetting out properties are similar to Pinol and Isomerpin, and used in dyeing of piece goods or any material in the closed type of machine, Neomerpin is a valuable aid in both penetration and leveling. It is absolutely proof against lime and can be used in very hard water.

All these products have a protecting action against alkali. They also have a softening effect and they all have in common the property of quick and thorough wetting out of all kinds of material.

Some of our new products will meet your particular requirement or solve your problem and improve your product. Ask for recommendations and further information.

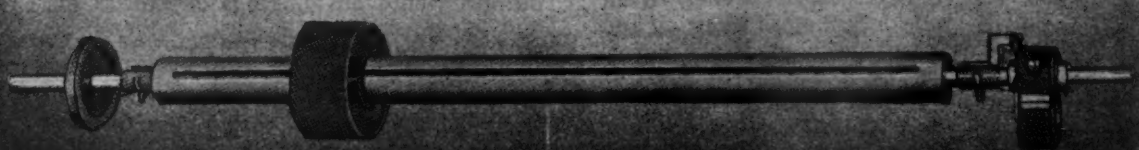
Newport Chemical Works, Inc.

Passaic, New Jersey

ROY'S IMPROVED COTTON CARD GRINDER

ESTABLISHED ~ 1868

Only plant in the world devoted solely to Grinding Machinery for Textile Mills ~



HAVING devoted our entire efforts for fifty-six years to building Grinding Machinery for Textile Mills, it is but natural that this specializing should result in a superior product.

Then, too, it is the only plant in the world that confine themselves to this one feature.

The Roy Improved Card Grinders, as illustrated, are considered standard throughout the trade. Many hundreds have been installed, and are giving complete satisfaction.

Write today for information and prices. Circular sent on request.

Repair work given immediate attention.

See Our Exhibit at Greenville, Spaces 67 to 71.

B. S. ROY & SON CO. WORCESTER, MASS.

—the change gears on the card should be checked and if found to be correct, the sizings in the picker room should be investigated.

As to the duties of a card stripper; a card stripper can take care of twelve cards. By "take care of" I mean he has to put his own laps at the back, doff his own cans and take them to the next process, for which purpose trucks are supplied. They strip the cards three times daily. When stripping, three strippers work together, that is, one man will get the cards ready for stripping while the other two do the stripping, and after the cards have been stripped, he pieces them up again and looks after the other strippers' cards so that no laps are allowed to run out or other inferior work made during the stripping. When laps are running out it is a very strict rule that the ends should not be allowed to dangle on the floor, and when placing a new lap, no overlapping is allowed.

Mr. Soniaman brings to the front the question of the number of wire used. In the mill I am connected with at the present time we use 120s wire on the cylinder and 130s wire on the doffer and flats. This wire seems to give good results with both Sakellarides and Egyptian and American cottons, as the web coming off the doffer is practically free of neps. The life of card clothing should be at least twelve years, barring accidents, which are bound to occur from time to time, regardless of what precautions are taken. Flats, cylinders, doffers and lickers-in should be thoroughly inspected by the superintendent and overseer at least once a year, and all inferior clothing should be renewed. All accidents harmful to card clothing should be immediately reported to the overseer or second hand. Records should be kept of all renewed card clothing. In one mill they stencil the date of renewal on the side of the cylinder, where one can see it at a glance. W. O. R. (Mass.)

A Traversing Fan for Warpers.

Editor Cotton:

There has long been a demand for an effective and reliable fan for keeping the lint off the drop wires on warpers. Warpers do not come equipped with fans, and many superintendents have had more or less crude home-made fans mounted on one end of the machine so as to blow down and across the line of drop wires. The fan is usually driven by a belt from a special sheave on the main drive shaft.

These fans help some, but they are not high-speed fans and deliver only a small amount of air at low velocity. Often being poorly mounted, they wear out quickly, and if oiled at all will throw the oil badly. Furthermore, they always blow in the same direction, and do not dislodge the fly effectively.

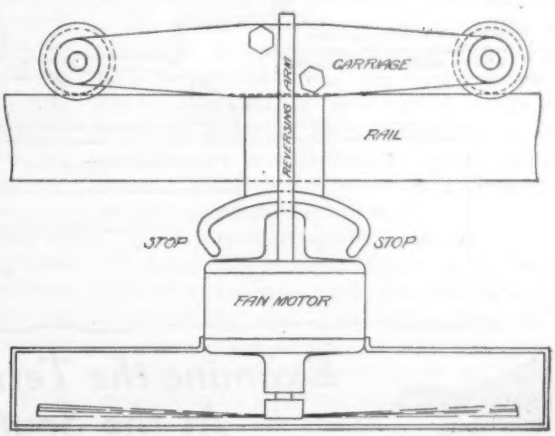
An entirely new departure in warper fans is now being brought out for this purpose. This fan traverses across the warper, blowing in alternate directions on each trip. The unique feature of it lies in the fact that it has no mechanism pulling it back and forth, the lateral movement being obtained entirely by the reaction of the fan itself. It literally blows itself back and forth over the work.

Reference to the outline sketch herewith will show how this is accomplished. The carriage for the fan is mounted on ball bearing rollers. These are made with the finest and most accurate bearings obtainable so that very little impulse is required to move the carriage. The fan itself is hung from the carriage by a bracket which is held in place by the two cap screws shown at the top of the carriage.

The fan is mounted so that it is free to rotate about its own center of gravity and can be swiveled back and forth just as an ordinary oscillating desk fan does. In the sketch the fan is shown in the neutral position. The rail on which the carriage is to run is leveled carefully, so that there will be no up or down hill to it. Now, if the fan is tipped in either direction as far as it can go for the stops on the carriage, it will blow at an angle to right or left, setting up a repulsive action that pushes both fan and carriage along on the rail.

When the end of the traverse is reached, the reversing arm strikes against a projection that holds it while the carriage moves forward pushing the fan over in the opposite direction. The fan will then make a trip to the other end of the warper, where it will be again reversed and start back once more.

The operation is entirely automatic, the fan reversing itself and starting back at the end of a trip. This makes



it extremely simple and eliminates all intricate auxiliary traversing mechanism which would otherwise have to be used. A standard make of electric fan is used.

This arrangement not only has the advantage of providing a powerful blast of air as compared with ordinary warper fans, and blowing it right down on the drop wires, but the air is alternately blown in different directions, first to right and then the left, which makes it much more effective than if it simply blew straight down all the time.

The fan may be moved out of the way instantly if the attendant finds it in the way in piecing an end, and may be as quickly started on its way again when the end is pieced.

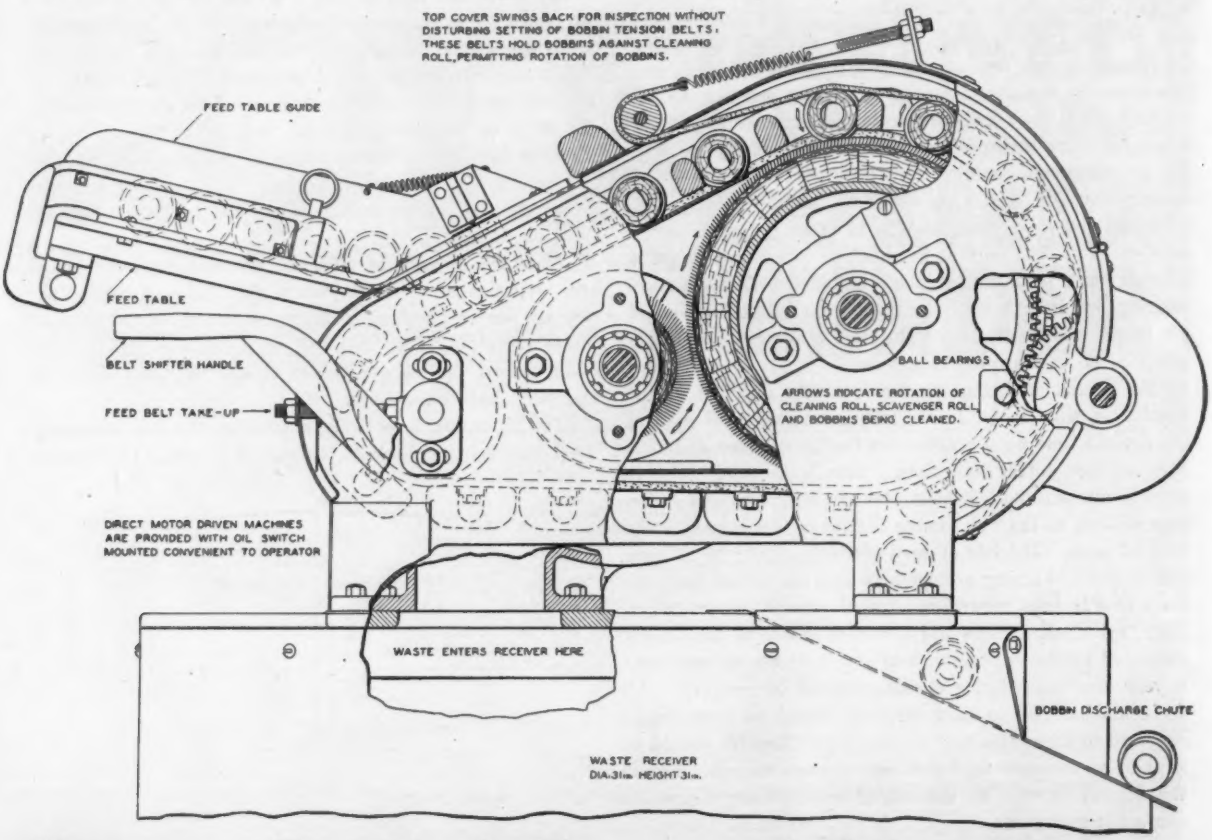
Being simple in construction, and using a standard make of fan, the whole assembly is moderate in first cost and upkeep. All parts except the fan will last indefinitely, and if a fan motor should burn out, the cost of replacement with a standard part is small.

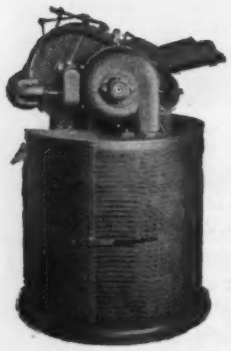
A patent for this new device has been applied for by the Aldrich Machine Works.

R. C. (S. C.)

W. H. Harriss, cotton goods merchant, has become associated with J. H. Lane & Co., and will have charge of a new department for the development of high-class cotton novelties for the wholesale and cutting-up trades.

See How Mills Are Cutting Costs!


TOP COVER SWINGS BACK FOR INSPECTION WITHOUT DISTURBING SETTING OF BOBBIN TENSION BELTS. THESE BELTS HOLD BOBBINS AGAINST CLEANING ROLL, PERMITTING ROTATION OF BOBBINS.
FEED TABLE GUIDE
FEED TABLE
BELT SHIFTER HANDLE
FEED BELT TAKE-UP
DIRECT MOTOR DRIVEN MACHINES ARE PROVIDED WITH OIL SWITCH MOUNTED CONVENIENT TO OPERATOR
BALL BEARINGS
ARROWS INDICATE ROTATION OF CLEANING ROLL, SCAVENGER ROLL AND BOBBINS BEING CLEANED.
WASTE ENTERS RECEIVER HERE
BOBBIN DISCHARGE CHUTE
WASTE RECEIVER
DIA. 31in. HEIGHT 31in.



Termaco for roving bobbins. Cross-section shown at top of page.

Examine the Termaco and Utsman Machines At the Southern Textile Exhibition

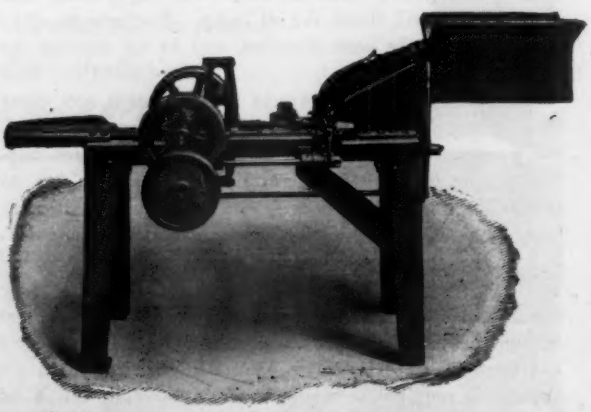
If your mill uses roving or feeler bobbins, there are two machines at the exhibition at Greenville, S. C., you should by all means carefully investigate.

The Termaco, for cleaning roving bobbins, and the Utsman, for cleaning feeler bobbins, have cut production costs an astonishing annual figure in mills where they have been installed.

They have cut cleaning costs, cut bobbin costs and effected many other savings that have made them a big paying investment for the mills which use them.

The Termaco and Utsman Machines are simple and economical to operate. They are built to give years of uninterrupted, satisfactory service. They clean bobbins more thoroughly and quickly than any other method. They clean without injuring or shortening the life of the bobbins.

Single-End Utsman, for feeler bobbins. Also made in Double-End Model.



We repeat—if your mill uses bobbins, by all means investigate the Termaco and Utsman display, in charge of members of our Engineering Department, at the Southern Textile Exhibition, space 233, second floor, main building. If you will not attend the exhibition, write us for complete information.

Termaco and Utsman machines are sold under a binding guarantee as to workmanship, material and operation.

The Terrell Machine Co., Inc.

Engineering Dept., Charlotte, N. C.

General Supply Co., Danielson, Conn., Rep. for N. Y. & N. E. (Northern representative handles complete stock of parts)

E. S. Player, Greenville, S. C., Agent for South Carolina

A Question on Spinning Frames.

Editor Cotton:

I would appreciate the opinion of some of your readers on the following question:

What is the relative production to be expected from two spinning frames making 30s warp from 1⅛-inch cotton, all factors being the same with the exception of the spindle speed, one frame running 8,700 r.p.m. and the other 9,600 r.p.m. By "factors" I mean such matters as quality of cotton, tightness of belts, twist per inch, machinery specifications, condition of top rolls, weight of travelers, banding, atmospheric conditions, operatives, etc.

K. D. (Mass.)

Fair Dealing

Editor Cotton:

When is an order delivered? That is an important question for the operating executive to ponder. My own experience and belief is that an order is not delivered until it is fully understood, and fully visualized in the mind of the one to whom it is given. I am afraid we too often assume the party should know what we mean without going into any explanation. This is wrong, because it is very easy to misconstrue an incompletely given order, and oftentimes the wrong conception will be placed—which can quickly result in friction and disagreement, and frequently the loss of an operative.

It doesn't take very much longer to fully explain an order, and then it is done. The operator in most cases wants to do the right thing, if he understands. Where there is a system of fully explaining orders there are less misunderstandings, which means better cooperation among the men.

And we should all take pains to give orders in the right spirit, and we should make sure they are understood thoroughly. When we understand each other we get along smoothly and our ways of working are taken care of even though we may not be present. There will be someone who will be the guard.

Sometimes it may be necessary to illustrate or draw pictures or sketches in order to better explain the point we want understood. We often hear the remark, "If you want anything done, do it yourself." That is not correct; it's only getting the other fellow to understand your wants.

To be a manager of help, a good manager that is, a man must take a lot of things into consideration and deal with folks as they are, not as he would have them to be. Thus their confidence will be won. Then, too, a man should always remember that his workers are not always as well educated as he himself is, and that he must deal with them accordingly. Some will require more detailed explanation than others to get the desired result.

Be true to all, never promise anything you have any doubt you can do—that is a good motto. It is better to not promise and explain that you will do what you can. We too often blow the help up to a point where they are certain they will get what is being asked for when we know at the time we cannot do it and endeavor only to pacify them at the moment, thinking that when the time comes for a showdown we will have another tale to get by with. This does not necessarily refer to wages, but to anything that might come up with the operatives—something they may want us to look after for them, some favor. It pays—and it is our duty as managers—to look after these things for the operatives. It forms a relationship which creates confidence and a feeling that comes from fair and square dealings. Let anyone say or do something against someone in whom you have confidence, and see how quickly you'll take it up. It's just human nature. We all have hearts and they need comforting. The soothing of the heart is the most wonderfully magnetic attraction in the human being. And then, too, it's only doing our just duty.

T. A. D. (Ga.)

Roving Frame Cones and Equations.

Editor Cotton:

I see in the August issue that "H. H. Y." has given us another mouthful of equations. I will give him credit for being a fair mathematician, but his article demonstrates to my mind that he still has much to learn about fly frames.

An equation is an expression of equality between two quantities. In mathematics the same quantity may be added to or subtracted from each member without destroying the equality, but not when applied to the intermediate speeds on fly frames, for the reason that on all fly frames conditions are unequal from the start to the finish of the bobbin. This it is that brands the fly frame the most imperfect machine in a cotton mill.

In his fourth paragraph in the August issue, "H. H. Y." states, "The equations I gave in the March issue are sufficient to design the roving frame cones, and perhaps the readers wonder why I said nothing about the pressure of the presser. The answer is because it was not needed."

This statement demonstrates to me that "H. H. Y." should learn the difference between a designed pair of cones and a modified pair of cones to suit the hank, speed, flyers and cotton used. He writes about fly frames and yet states that in the modification of cones, the pressure of the presser pad is not to be considered, or, using his own word, "needed." Is not the slippage of cone belt and the variation in pressure of the presser pad the chief trouble on all fly frames? It seems to me that a practical man, in writing of fly frames, would not have omitted this fact. Since writing his March letter, I believe "H. H. Y." must have talked with someone familiar with fly frames, which accounts for his August letter.

"H. H. Y." is dead right when he says that "the fundamental principles underlying the successful operation of a roving frame have been much misunderstood." I doubt if any of our best carders would ignore the pressure of the presser pad when writing an article, or in operating a fly frame. Any practical man could not overlook this factor if he tried, simply because it is the chief evil on all fly frames.

In his third paragraph "H. H. Y." seems to sidestep the practical point regarding the pressure of the paddle caused by either a weighted presser or a high speed. Instead he claims by no means could it be used to show the relation between frame speed and cone outline. Take notice that he gives no equations to prove his case. If the Dunn flyer will change the cone outline which is due to increasing the pressure, and as we know that a high speed will also in-

The Equivalent of 150 'Round the World Flights

The army flyers who encircled the Globe have won the admiration of the world. No less noteworthy, though not so dramatic, is the record of those TOLHURST machines that have been constantly in service the past 30 and 40 years. For example, a 48" TOLHURST installed in 1894 has carried its loads considerably more than 100,000 miles per year, or between three and four million miles, during the 30 years of its operation. This is equivalent to about 150 times the distance around the earth at the equator. Repairs have been negligible. This is not an unusual example of the long service that can be expected of TOLHURSTS.

TOLHURST MACHINE WORKS, TROY, N. Y.

ESTABLISHED 1852

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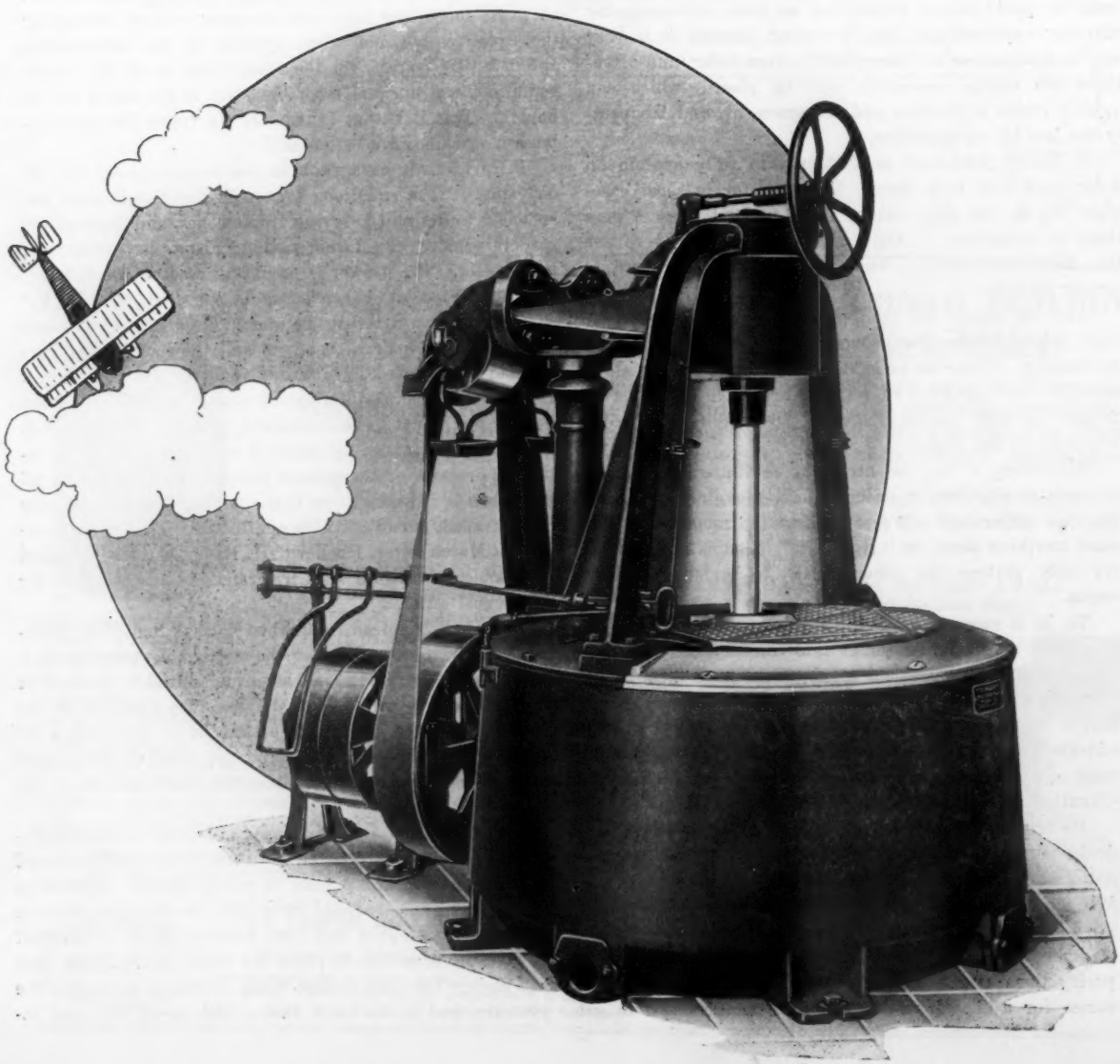

crease the pressure, then why are not these factors to be considered in the relationship of frame speed and cone outline?

They must be considered.

Now I am going to confess to "H. H. Y." that I know little about equations, and would appreciate having him work out the following example by equation:

Make of frame, Providence machine. Change compound pinion from 16 to 14 teeth. What changes should be made to make conditions equal, and what effect does the change make in the lateral movement of the cone belt, and also the working area of the cones?

This should be an easy one for anybody who understands the fundamental principles underlying the successful operation of a roving frame. Wash (R. I.)

Moire Finish.

EDITOR COTTON:

I should be glad to have some reader of "How Other Men Manage" advise me as to what would be the best and most practical method to adopt for the producing of a Moire Antique finish on green cloth, such as the accompanying sample. C. K. (Wis.)

EDITOR COTTON:

Replying to "C. K. (Wis.)" would say that the sample he sends is embossed on an embossing calender which has a moire pattern and spun silk engraved on the brass shell. A good imitation of it is the same finish but embossed on the calender thus:

Length	100 yards
Width	42 inches
Counts per squares (¼ inch)	14 x 16
Weight	26 pounds
Finished width	39 inches

After mercerizing, dyeing and mangling, the cloth is

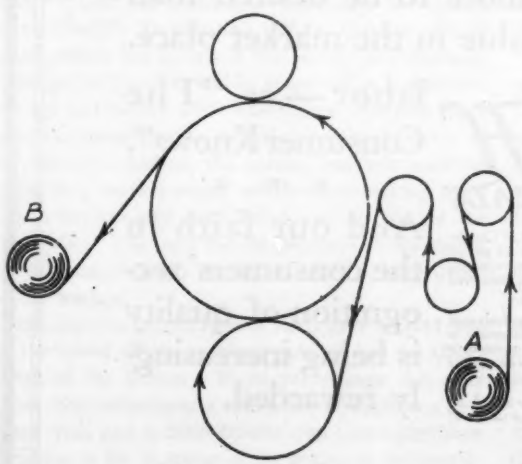

FIG. 1

dried on a drying machine and allowed to cool. It is then conditioned on a damping machine and allowed to lie for two hours. After this two batches of the cloth are run face to face through a friction calender almost cold and with the friction on. After one passage the position of the cloth is reversed so as to bring that cloth, which was previously in contact with the cotton bowl, in contact with the warm (or hot) metal bowl, and again passed through the calender. The result of this treatment is to produce an equal gloss on the back of both pieces while the face is moired.

In the piece you send the finishing may be the same, but after finishing it is stretched on a belt stretching machine. After stretching it is passed once through a dead set friction calender, using a heavy pressure. It is then stretched again and passed once more on the reverse side, through a heavy pressure friction calender, using medium pressure and heat. After this the goods are *embossed* on the face side.

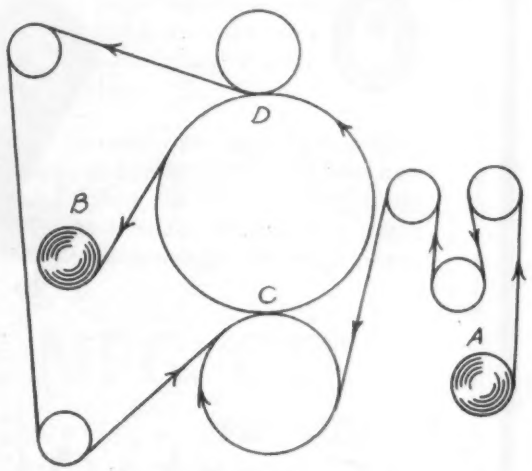

FIG. 2

The best way to do them is as follows in Fig. 1 and Fig. 2. In Fig. 1 the goods are run from A to B once, following the arrows, through the friction calender warm, not hot. This finishes them on the back. They are then turned over and run on the other side, Fig. 2, and *chased*, once or twice like drawing, following the arrows from A to B, hot and good set. This is the best way for goods sent by " C. K." There is no double run, all are single, but they double between C and D in Fig. 2. They are finished and prepared like the others given above. All piece goods must be singed well. W. B. (Maine)

Some Causes for Fluted Rolls.

EDITOR COTTON:

In regard to the causes of fluted top leather rolls, I give below some that I have found from experience:

A fluffy skin (which I believe to be diseased or from an unhealthy animal); skins not properly cured and tanned; skins which are uneven in thickness; cots too large, thus allowing them to crease or flute; using too soft a flannel for cushions; putting them on the filling around the roller; flannel too large for the roller causing it to be bulky; inferior workmanship; rollers not being burned down properly; and rollers being kept in a damp place, allowing them to become soft.

Top leather rollers, after being re-covered, should be kept in a good dry, warm place like, say, the engine room. This insures their remaining hard, which is desired.

A. B. (Ga.)

42nd Year

Confidence

MANY things contribute to confidence in a product or an institution. The sum total is that state of mind where much is left unsaid, where the performance of an unasked guarantee is assured.

And because the winning of confidence is such a wonderful thing, its possession more to be desired than fine gold, it has a tangible value in the market place.

R & H Chemicals have attained full measure on the yard-stick of confidence. Into their making go knowledge, experience, and painstaking labor — as "The Consumer Knows".

* * *

And our faith in the consumers' recognition of quality is being increasingly rewarded.

R&H CHEMICALS

A partial list of R & H Chemicals—together with price changes and comment on special market features — is published each month.

This list includes chemicals used by the consuming industries. It is used regularly by many as a guide in the purchase of materials.

We shall be glad to include on the mailing list the name of any one interested.

The ROESSLER & HASSLACHER CHEMICAL CO.

709 Sixth Ave., New York

ARTIFICIAL SILK

This is comparatively a new material for fabric making but is rapidly growing in favor for mixed fabrics, especially with cotton mills on all sizes of average numbers, fine and coarse. The artificial silk yarn is so different from yarn of any other material that it requires special attention to the harness-eye in order to make a satisfactory fabric.

From the very first, when this new material began to be used, we have been making heddles for artificial silk yarns and have continued to improve and perfect the harness-eye until now it is generally conceded that any mill whether making cotton, silk or other fabrics, can without hesitation depend upon our artificial silk loom harness to make a fabric with entire satisfaction. And the beauty of it is that these heddles are interchangeable for use on cotton, silk, and yarns of other material just as well.

STEEL HEDDLE MFG. CO.

GREENVILLE PHILADELPHIA PROVIDENCE

SOUTHERN PLANT, GREENVILLE, S. C. HAMPTON SMITH, SOUTHERN MANAGER.

"Duplex" Loom harness—complete (With Frames and Heddles fully assembled)

Heddles
Harness Frames
Selvage Harness
Leno Doups
Jacquard Heddles
Lingoes

Drop Wires (With Nickel-Plated Copper-Plated or Plain Finish)

Improved Loom Reeds
Leno Reeds
Lease Reeds
Beamer Hecks
Combs

A Rule for Humidity.

Editor Cotton:

Following a previous letter of mine, in which I advised against changing the tension gear to alter the tension on a fly frame, "Wash" has asked me, "What does the ratchet or rack gear affect?" In answer I will say that the rack or ratchet gear affects the speed of the bobbin and carriage, and any change in this gear will be imparted in proportion to the carriage and bobbin alike. There is no provision made in changing this gear for the variation in the diameter of the roving, and in addition, the ratchet brackets must be adjusted, the stop motion re-set, which when making three or four hank rovings will take a full half-day to get the machine in order. The only benefit obtained is stretching the roving to make the ends run tight, which is very detrimental to the work.

Now what does the lay or reverse shaft gear affect? The answer is the speed of the carriage only, it has no effect on the speed of the bobbin. When you change this gear you make no other adjustments. You are through in a few minutes, and with just a little trouble you make provision for the variation in the diameter of the roving as the humidity varies—I speak of extreme humidity. However, if a relative percentage of humidity is maintained this change is not necessary once in a year.

Now with reference to the starting point as mentioned by "Wash," I get this by adjusting the cone belt, which is done by loosening a nut and moving the cone belt guide as I wish.

In regard to the law of temperatures and humidity, cotton must also be taken into consideration. It is said that cotton contains cellulose and waxy or oily substances, which will soften and more easily absorb moisture under high temperature than under low temperature—and this is where some men are misled and stumble over humidity.

We run the humidity at a certain percentage of wet bulb to that of the dry bulb, and this percentage is maintained regardless of temperature. Here is a scale and a very good one to use in practice: Wet bulb must read 88 per cent of the dry bulb. Therefore, with 65 degrees on the dry bulb, the wet bulb should carry 88 per cent of 65 which is 57 degrees, or eight degrees difference. With 75 degrees on the dry bulb, 88 per cent would be 66 degrees for the wet bulb, or a difference of 9 degrees with a temperature of 75 degrees F. With 85 degrees on the dry bulb the wet would show a reading of 75 degrees, or a difference of 10 degrees at a temperature of 85 degrees. 90 degrees on the dry bulb would give 88 per cent $\times$ 90 or 79 degrees on the wet bulb, or a difference of 11 degrees with a temperature of 90 degrees. This is plain, so temperature is not so bad after all.

If we keep a certain number of degrees of difference there will be too much humidity at times. For example, at 65 degrees there is eight degrees difference between the bulbs at a percentage of 88, and at 90 degrees if there are but eight degrees difference, you would not have 88 per cent, but 91 per cent, which is too much for this temperature.

With further reference to "A. B.," I have no criticism at all for his or "Wash's" or others' writings. Neither do I become offended when someone takes issue with me. I rather welcome it for there is much to learn and one of the best methods is through the exchange of views. If I have

ELWELL-PARKER TRUCTORS

used in

OVER 200 BRANCHES OF INDUSTRY

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Let us advise you in reducing your time and labor in handling cases, bales and chemicals in mill and warehouse.

Catalog 130-C upon request.

The Elwell-Parker Electric Co., Cleveland, Ohio

50% Better than ever from YOUR Standpoint

SEVERAL NEW FEATURES

have been added to the "1912" cloth Cutting, Fold.ng and Winding Machine which add at least 50 per cent to its value to YOU.

It will cut your cloth—fold the edges—roll it up and give you an exact measurement of every piece of cloth going through the machine.

It saves time, labor, machines and cloth.

YOU ONLY NEED ONE MACHINE where before it required two and you get an extra strip from each bolt of cloth.

It cuts the corners of expenses in every way and leads to more and greater profits.

THE ENORMOUS SAVING WILL INTEREST YOU.

Mail a card for complete information and prices.

When in need of special machinery, write us.

J. A. FIRSCHING. 614 Broad St., Utica, N. Y., U. S. A., Dept. "C."

ALL STEEL ECONOMY FIRE PROOF BALING PRESSES

ALL SIZES FOR ALL PURPOSES

LARGEST LINE BUILT IN U.S.A.

ECONOMY BALER CO., Dept. C, ANN ARBOR, MICH., U.S.A.

misstated anything in this letter I should be glad to have it brought to my attention by some of your readers.

T. A. A. (S. C.)

Does the Size of the Traveler Affect the Twist?

Editor Cotton:

I have been much interested in the discussion as to which puts the twist in yarn, the traveler or the spindle. There have been many good thoughts developed, but it seems there is something more to be said. "Bab's" thoughts in the August issue are all right, but I have always been of the opinion that the twist on a ring frame is governed by the ratio of speed between the spindle and the front roll. It seems that "Bab" advances the theory that the size of the traveler would govern the twist in the yarn. I don't think this is correct. Naturally there is some variation in spindle speed between a full bobbin and an empty one. I think this will account for the difference, if any, in the twist. My idea is that the spinning traveler acts as a tension weight for the strand of yarn between the front roll and the ring, as a sort of an eye working in conjunction with the traverse to lay the yarn in the proper position on the bobbin. I think some tests on this should be helpful. I believe if "Bab" will take his twist with the traveler as heavy as he can run it, and then make another test with the traveler as light as possible, he will be convinced that the speed of the spindle and the front roll speed govern the twist.

I hope to see more discussion on this point.

N. T. (Tenn.)

The Lime and the Caustic Boil.

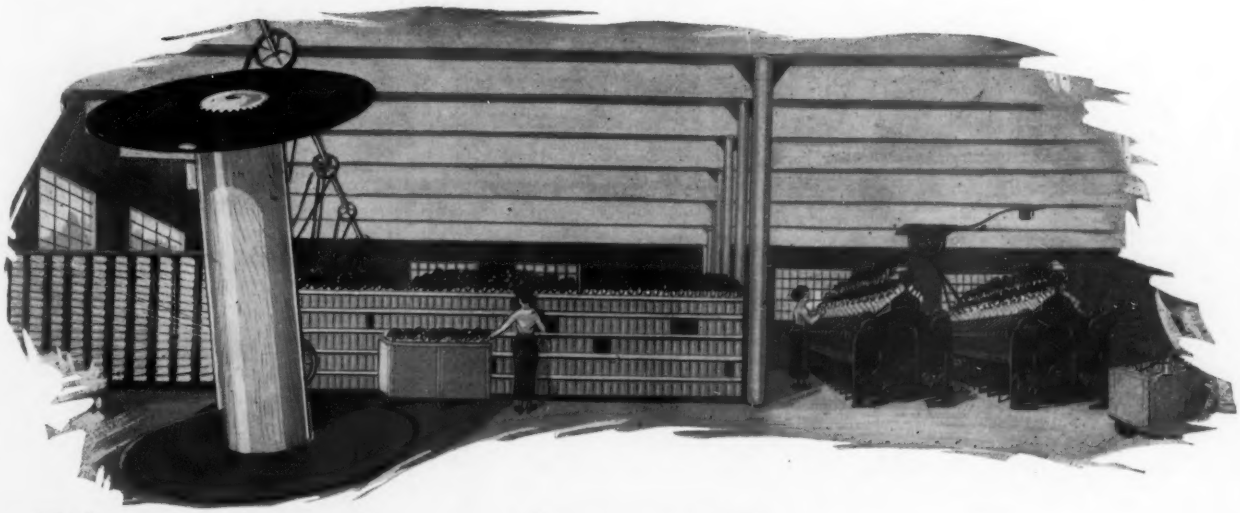
Editor Cotton:

I recently was asked by a bleacher friend which is the better in bleaching regular work, the lime system of boiling, or the caustic soda system; and he asked me to explain the merits of each. Here is what I told him:

There are two systems of dye boiling in general use, the older one, known as the lime boil, is rather complicated, and is not, among the average bleachers, fully understood. This, especially among finer bleachers, has been largely replaced by the caustic soda boil.

The lime boil consists of boiling the limed goods eight to ten hours at a pressure of one to two atmospheres in boiling water. This converts the wax and oil into lime soaps while the pectins are at the same time converted into soluble compounds and the tannus into calcium tannate. After the lime boil the goods are soured in a solution of hydrochloric acid at 2 degrees Tw. This has the effect of decomposing the lime compounds, leaving the free fatty acids and pectins on the goods, while the liberated tannic acid goes into solution. The soured goods are again washed into the kier where they are now boiled in a solution of soda ash and rosin soap as before. By this means they (the liberated acids) are now converted into soluble sodium compounds which are subsequently removed by washing in water.

The lime solution is obtained by mixing quicklime (56 pounds) with water (100 gallons) and, after extraction, passing the mixture through a sieve, the goods are run



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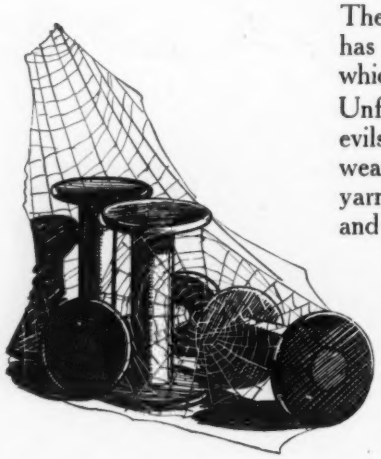

The influence of proper spooling and warping upon the finished fabric has not been generally realized. Yet they are the foundation upon which production is built.

Unfortunately, spooling and warping have been regarded as necessary evils. Their purpose is to put the yarn in more convenient form for weaving. While perfect spooling can add nothing to the value of the yarn, the use of antiquated equipment is reflected in defective fabrics and the loss of a sizable sum through labor and time wastes.

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through this into the kier. The rosin soap is generally made by boiling, until emulsified, ten pounds of rosin with 35 pounds of soda ash in water and adding about eight times its volume of water. In the first case—that is, the lime water—after the goods are run into the kier they are covered (from a tank) with boiling water. In the caustic soda boil the goods are packed into the kier, after being *steeped*, and covered with liquor at 2 degrees Tw. and boiled as before in caustic soda and after souring, which may be sulphuric acid, are boiled the second time in 60 per cent soda ash and 40 per cent caustic soda as before. Or sometimes, they are only boiled once if the goods are low and open, they are then boiled in a mixture of caustic soda and soda ash, soap is sometimes added; in any case the liquor should cover the top of the goods.

Now the relative merits of lime and soda boils have ever been the subject of much discussion, and to some the lime boil is not a good thing, but I believe it largely for some goods. In the first place the lime has a greater power in saponifying fat; and for heavy piece goods the preliminary liming or mechanical impregnation of the goods sets up a number of local centers of activity. It must be remembered that the caustic soda boil costs more, in that a good steeping is necessary and that it takes a more efficient and competent circulation than lime does; again it is not so easily stained as lime.

In fact, the question as to which is better for the first boil, lime or caustic soda, resolves itself into an inquiry as to what use the bleached goods are intended for afterwards, and the type of cloth and its weight have to be taken into account. Lime appears to exert a much stronger action than caustic soda, resulting in a bleached cloth which is well *bottomed* and which can afterwards be put into work with the greatest confidence. Certainly where the best and most efficient bleach is required, lime boiling, followed by soda ash boiling, is the process which gives the most satisfactory results. Lime boiling is particularly desirable for cloths intended for dyeing fancy shades, since the dyed shades come up clear as possible and there is little chance of stains contracted prior to bleaching.

Lime boiling is cheap and gives good bleaching but requires more care than the caustic soda boil, as the tendency to stain and tender the cloth is much greater. However, these disadvantages can be largely overcome by keeping the goods well covered with liquor during the boiling, and after, and by keeping the top of the goods well covered. There are lots of cases where good bleaching is not required such as printed goods, heavy styles, and many white goods, in such cases if the goods are white, that is all that's required; and in these cases the caustic soda first or in one boil will meet most requirements. Under the conditions obtaining in modern bleaching, sodium carbonate (i. e., soda ash) is quite valueless for first boiling, as it has not the power to completely saponify the fatty matters present in the goods. It is, however, generally used as the scouring material in the second boil following the first boil in lime or caustic soda.

W. B. (Maine)

The annual meeting of the National Association of Cotton Manufacturers will be held on Wednesday and Thursday, November 12 and 13, at the Copley-Plaza Hotel, Boston. The general topic will be the manufacturing and selling of cotton goods. A cabaret-supper and banquet will feature the social activities.

Breaking in the Young Man.

Editor Cotton:

The discussion which you have been conducting with reference to the college man in the cotton mill has been interesting. For the most part, however, those taking part have been college men of one sort or another, and we have not read much giving the viewpoint of the older men in the mill. I am sure that these men, like myself, have been keeping up with the letters on this subject, and in the thought of presenting the viewpoint of one of them—myself—and possibly of throwing out some suggestive thoughts for both the college man and the non-college man in the mill, I am writing this letter. I shall also give some of my own reactions to the various thoughts developed in the discussion.

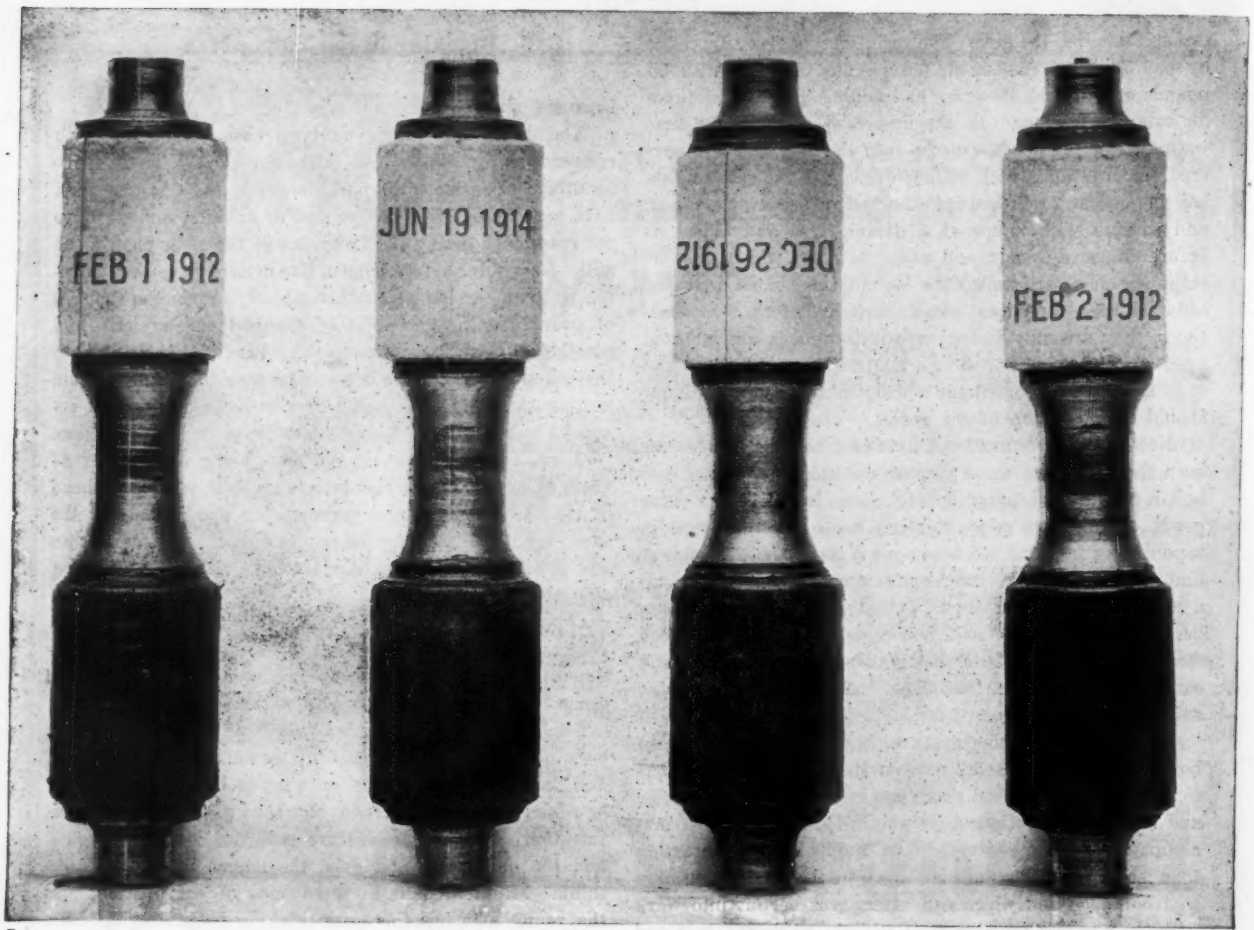
I am, comparatively, an old man, being upwards of 47 years of age, though I still believe my best years are ahead of me. Less active ones, perhaps, but good ones just the same, for it will take a guiding spirit, backed by experience and practical knowledge, to operate the mills. So, I figure, why not I?

There are several ways to look at this advent of the young educated man into the textile industry. Most "old-timers" have been brought up in the rough-shod manner. Some have been blessed with sufficient education, and that is fine, but what about the mill who has a man that has not been blessed in this manner? It is suffering a handicap, and that should be the one we want to help out. Possibly he needs the contact of new blood. Possibly he needs refreshing. A man's actions are governed by his thoughts, and the older a person gets, the longer it takes him to think. Minutes count in these days of competition, and the young man has the quick-thinking brain; he has been trained along that line. He may not have the tact or knack of managing the operatives, but if he will let them alone, they will run the machinery and will look after it. He must see that it is kept repaired and running, and must keep a general oversight on the cleanliness of the goods—provided, of course, that he adjusts himself to the conditions of the operatives, and is guided accordingly, that is about all he will have to do for a while.

We must have these new young men coming along, even if they are not yet right up to us in the mill. Whether they are in our mill, or in our neighbor's, the thought of knowing they are near us, and are preparing to take over the reins when we falter, sort of spurs us on to do more than we otherwise would. It's only natural to take it easy if we know there's no one ready to take our place. Personally, I am not counting on one of these young fellows getting my place, not yet, because I'm trying to make everything go well enough. And yet I like to be with those fellows, I like to encourage them in their efforts to learn the business.

We will have more competition in the future, and it's going to take a lot of new ways of doing things. Can the "old-timer" meet the challenge? It's difficult for an old overseer to change his ways of doing things, but there are a lot of kinks to be worked out. I might mention the yard complement of help. Is the company taking the same attitude toward the help outside the mill that it takes inside the mill?

The young man is more apt to catch onto new things, and it is easier for him to adapt himself to new and more



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Boston

economical ways of producing the goods to the mill's benefit. We must admit this fact, although it may be hard to do.

On the other hand, the young man must not expect to get to the top too quickly. He has a lot to learn. He must use good judgment, be considerate and conservative, and learn to align himself with the whims and characters of the operatives.

This may be of a little different tone from what "On the Road," and the others, have written, but it's straight from the shoulder.

Aside from the regular channels of competition that we now know, I'm afraid we shall have to contend with other situations in the future, such as running more machines with less labor, etc. Henry Ford, the great organizer, has started this, and while it may not pan out to his expectations, it will cause a lot of experimenting, so I hope that we old men won't get too huffy when the boss comes around and wants us to try some new methods.

Let's give the young man a living chance. If he proves good, we should welcome him; if not, the boss will look after him. Contributor No. 14.

The Mule Versus the Ring Frame.

Editor Cotton:

It pleased me greatly to read the letter of "Rig (Mass.)" in the August issue, because he is a mule man. I wish more mule men could be drawn into discussion in the "How Other Men Manage" columns.

In "Rig's" reply to my statement that "We are on the right path by installing ring frames in place of the mule," his facts do not cover the system under discussion sufficiently to convince me that we are in error in so doing. He even admits the ring is more popular, his reason being because mules are not made in this country. That answer is too weak. Cost of production is the answer. I have spun 90s filling on the ring with 2.85 as a twist multiplier. A mill (and one of the best) in New Bedford is making 120s yarn with less than 3.00 twist multiplier, and the difference in cost of spinning these yarns is from four to six cents a pound in favor of the ring over what they would cost if spun on the mule.

"Rig's" sentiment regarding the mule is broad and well rounded. He admires the mule, but, let me say here, no more than I do myself, in fact I love it, and enjoy the pleasures of fixing a mule so that it will run sweetly, having all the changes working to a nicety; in fact having each operation act at its appointed time. This is not work to me but a joy, as I have had twenty-eight years experience with these machines.

I hope to be understood when I say it is with regret that I realize the end of the mule is close at hand. It is, however, a fact that we have got to realize, that the mule, the most wonderful machine in the whole industry, is too complicated for American methods of manufacture, and while quality may be somewhat impaired in the looks and feel of the cloth when the filling is spun on the ring frame, I venture to say that the wearing qualities have not been impaired, but improved, because of the higher twists applied to ring filling as against the softer twists of mule-spun filling.

In regard to the argument of labor turn-over, I will answer that. If a mule spinner leaves one job he has no other to go to; that is why there are very few changes. For example, my labor turn-over of mule spinners for the past six years has been as follows:

First year, lost 10 per cent.
Second year, lost 5 per cent.
Third year, lost none.
Fourth year, lost none.
Fifth year, lost none.
Sixth year, lost none.

It looks remarkable but not so much so when you realize the scarcity of jobs.

I think I have made it plain that I am not against the mule, but the ring frame is so simple that its success in the years to come will be more manifest than it is at present because competition is so great that cheaper operation is inevitable.

I have a record here of 1920 which I will add to these few remarks:

	Mule Spindles	Ring Spindles
Great Britain	41,000,000	10,500,000
United States	3,250,000	32,250,000
Canada	210,000	475,000

These figures speak very plainly. For each 100 mule spindles in Great Britain the United States had less than 1, while for each 100 ring spindles in the United States Great Britain had 33 per cent.

This report is obvious. We mule men have got to face facts *as they are* and not as we would like to have them.

Christy (Mass.)

Editor Cotton:

I am interested in the articles in Cotton on ring frames and mules. I think that "Rig," in the August issue, has the wrong idea of a ring frame. I think I am quite right in saying that the yarns which cannot be spun on a ring frame are now very few. It is not so expensive to run a ring frame. It is quite true that the labor turnover is smaller with mules, but it is much cheaper to run a mill with ring frames and female spinners than with mules and high-priced male mule spinners, regardless of yarn or quality. I think it need not be explained that ring frames are far superior to the mule as to production. I would like to hear more from "Rig" concerning mules. Dick (Mass.)

What Should Be the Breaking Strength of This Yarn?

Editor Cotton:

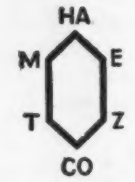
I have noted in many instances the useful information contained in your "How Other Men Manage" department, and at this time wish to invoke the aid and opinion of the readers of this department.

We are running 40s yarn, 28 turns per inch, out of commercial 1⅛-inch Arkansas cotton, and are unable to get an average breaking strength above 41.75 or 1.67 pounds per grain. The question is, what breaking strength should be obtained on 40s/1 from this cotton?

D. H. (N. C.)

Editor Cotton:

Replying to "D. H.," an advance copy of whose question was sent to me, I note he is using a 4.43 twist multi-



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ple. This is a medium warp twist, and all things being equal, should make a good even thread. However, I think that his breaking strength is weak, and would advise that each process, beginning at the pickers, be looked into carefully, especially the drawing. I think this yarn should give an average breaking strength of 45 pounds to 120 yards, if conditions are right, with the proper moisture, and if the cotton is a fair average of Arkansas staple. Excessive drafting or rolls not correctly spaced will cause weak yarn. E. M. (N. C.)

Figuring the Breaking Strength of Cloth.

Editor Cotton:

I would like to know, through "How Other Men Manage," if there is any rule for figuring the breaking strength of a piece of cloth before it is woven, provided you know the count of warp and filling and sley and the number of picks per inch. F. E. H. (Ga.)

Cotton Comment.

(*Continued from page* 1252.)

Meanwhile the price of raw cotton has been reduced to a point, around 22 cents, where it is at value, and trade buying on a larger scale is likely to be witnessed from now on, especially if the market declines further.

The average price of a commodity for a season has much to do with consumption, as noted by developments last season when the average price for the season was 31.67 cents per pound for middling, or higher, with the single exception of season of 1919-20 when it was 38.21, since the American Civil War. In consequence consumption of American cotton by the world last season was reduced to only 11,241,000 bales compared with 12,631,000 in season before last.

It is reasonable to expect, therefore, that the trade will be more disposed to buy for present and future wants around present prices, which are ever so much lower than the average of last season when the "peak" of the season was 36 cents.

Under the circumstances it would seem to be advisable for spinners, especially in America, to begin buying for future requirements.

Sixth Southern Textile Exhibition.

(*Continued from page* 1226.)

Whitin Machine Works, Whitinsville, Mass., will show the following machines: bale breaker; improved vertical opener, improved C. O. B. machine, three-sections; full roller two-card set with automatic feed, scotch feed and single bank ring doffer condenser; cotton and wool waste spinning frame, 36 spindles, 3⅛-inch gauge; flyer twister, 14 spindles, 10-inch space; C. & K. plain two-harness loom; two-bank tape condenser; Model "H" drawing frame, four deliveries; Model "B" spinning frame, 36 spindles, 3½-inch gauge; and a two-section roving waste machine.

By installing a fan and condenser, and depositing the cotton as opened, bloomed and cleaned by the machines mentioned, the visitors at the Exposition will be able to notice the condition in which the cotton is prepared. On the full roller two-card set, with the two feeds and single bank ring doffer condenser, floor sweeps will be run, making 4s yarn, which will be spun on the cotton and wool waste spinning frame into filling yarn which, in turn, will be woven on the loom furnished by the Crompton & Knowles loom works. The loom will use a 20s/2 warp and the goods will be woven in the gray.

On one side of the waste spinning frame, the company will have a 1⅝-inch ring and six-inch traverse, and on the other side a 2⅛-inch ring with nine-inch traverse, both sides making the 4s filling. A double jack spool creel is to be used, which means there will be two spools. Consequently all ends will go to the respective side from the respective spool. By having the ends off the bottom of the spool it will be much easier for the operator to run this machine and, in every way, easier to handle, it is pointed out.

By the use of the Morse silent chain drive, it is now possible to change the speed of the twister head without changing the spindle speed and vice versa, it is announced; also the trouble of splicing the rope drive is eliminated.

On the flyer twister, the same yarn as on the waste spinning frame will be used, the main item of interest being the combination bobbin creel and jack spool creel.

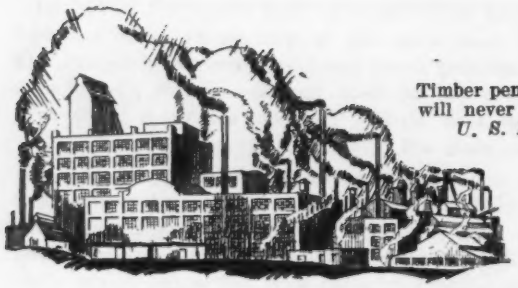
The Model "H" drawing frame, four deliveries, is announced as an absolutely new machine. In bringing out this machine, the manufacturers announce they were able to simplify and strengthen it; there are some 56 castings which have been eliminated; the machine has been shortened three inches in width; the sliver cans can now be brought in closer to the back. This frame is to run cotton of 1-inch staple, going in at the back 48 grains with six ends up and with a draft of 5.33, coming out at the front as 54 grains.

New features on the Model "B" spinning frame include: The back bars will be of steel; the traverse motion will be self-contained, so that as the rolls are set the traverse motion is automatically set also; the back bar fingers are interchangeable; there is a new head crown gear cover; the head end itself will have the new swiveling panels with its new locking device; the jack and cylinder gears are newly designed spiral gears, designed for less vibration and noise. A new clutch spindle will be exhibited.

The two-section roving waste machine has been improved, it is announced. The friction drive has been simplified and made more positive; in the bonnets of the cylinders, air ports with two sliding panels for adjustment have been cut; the delivery apron has been improved. It has a self-contained motor drive.

The Fafnir Bearing Company, New Britain, Conn., will exhibit a complete line of ball bearing applications for textile mills. Their display will demonstrate the rapid development of ball bearing applications for transmission and textile machines. The Fafnir long inner ring bearing driven by self-locking collars and protected by Fafnir patented mechanical dust seals, around which the units are built, will be displayed. Revolving shafts, equipped with ball bearings, will also be exhibited, as well as sample applications for pickers, cards, spinning frames, slashers, warpers, fans, blowers, loose pulleys, etc.

New York & New Jersey Lubricant Co., 401 Broadway, New York, will have on display their full line of "Non-Fluid" oil modern textile lubricants designed for lubricating every machine employed in the carding, spinning,



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twisting and weaving of cotton. A textbook on the subject of lubrication, which has just been issued and which illustrates every machine through which the cotton passes from the bale to the packing room and treats of the lubricating difficulties usually experienced in textile mills and the remedies for them, will be distributed gratis at the booth. Lewis W. Thomason, the company's southern district manager, will be in charge of the exhibit, assisted by W. H. Higginbotham, F. L. Thomason, and W. C. Taylor, as well as by other representatives of the company.

Chicago Bridge & Iron Works, 37 West Van Buren St., Chicago, Illinois, will maintain an exhibit which will feature various pictures showing Horton tanks which have been built for textile mills and other industries of the South. There will also be some examples of Horton workmanship, it is announced, including riveted and welded joint specimens. The booth will be under the direction of R. M. Campbell, district sales manager, with headquarters in Atlanta. Cedric B. Smith, advertising manager, will also attend.

J. B. Ford Company, Wyandotte, Mich., will maintain exhibit space in the main hall during the exhibit, showing samples of work accomplished with the well known "Wyandotte" products. C. P. Hostetter, of Atlanta; J. G. Schaeffer, of Charlotte, and P. G. Westmoreland, of Greenville, will represent the company.

Link-Belt Company, Chicago, Ill., plans to exhibit in actual operation their silent chain drive for textile mills. The exhibit will be in charge of Harry Mitchell, engineer, from the Philadelphia office.

The Mathieson Alkali Works, Inc., 25 West 43rd Street New York City, will exhibit at the Sixth Southern Textile Exposition showing samples of their various products, including 78% solid caustic soda; 76% solid and flaked caustic soda; soda ash; bicarbonate of soda; modified Virginia soda; bleaching powder; coumarin; benzoate of soda and benzoic acid. They will also distribute material illustrating the various containers for these products, in packages from five pounds up to 700 pounds. Representatives will be present to discuss and demonstrate the Mathieson system for perparing bleach liquor from liquor chlorine.

The booth will be in charge of E. E. Routh, southern district sales manager, assisted by R. B. Tarleton and other members of the southern sales organization.

Practically this same exhibit was displayed at the Carolinas Exposition in Charlotte, N. C., September 22nd to October 4th, under Mr. Routh's charge.

Morse Chain Company, Ithaca, N. Y., announce that they will have on exhibit an interesting textile drive in operation, together with samples of different size chains. An automatic machine will project and enlarge photographs of various textile applications, and will show a different picture every 30 seconds. In attendance will be V. D. Morse, general sales manager, Ithaca; J. S. White, manager of the Boston office; Earl F. Scott, manager of the Atlanta office, and F. A. Pritchett and H. E. Matthews, of the Charlotte office.

The S K F Industries will exhibit at the Sixth Southern Textile Exposition in Greenville, showing a range of Skayef self-aligning ball bearings, also special housings for textile machinery. Skayef self-aligning ball bearing hangers, post hangers and pillow blocks will be shown for the first time, as well as a new replacement box. A long line of shafting will demonstrate the characteristics of the hangers and pillow blocks, while models of unique design will demonstrate the anti-friction qualities of ball bearings. Representatives in attendance will include W. H. Holby, T. S. Jackson, H. A. Fonda, E. M. Potter, L. H. Bailey, R. W. Franklin, Nils Miller and A. Vieth.

Operating Executives of Georgia.

(*Continued from page* 1242.)

manufacturing from them, and turn them loose with every type of loom that there is in the industry today, with the yarn markets of the world at their command, and ideas brought to them by buyers, and they are bound to stumble across something. If we were only making sausages in that plant, we would be bound to stumble on a better way to make sausage. You cannot help it if you concentrate on one thing.

We have $5,000,000 worth of merchandise today, that can be sold at a profit to mills, who have looms to put it on. Check that statement from this. I invite any mill man, who may be a skeptic, to visit that plant in Paterson, N. J., and go with me to the buyers in New York, who will tell you they will take certain lines of merchandise we have made at a profit to the mill. So much for that.

I invite any man with any manufacturing problems, especially those concerning weaving, to submit them to us. They in turn will be turned over to our plant. Those men may take three weeks; they may take three months before they give you an answer, but either one of two answers they will give you—either work it out or "It cannot be done."

Now that may be just a little bit advanced, but working through it all as I have for the past five years it does not seem so queer to me. Radio, a few years ago, and thousands of other things we would not have believed in, and the only reason that this plant was, at its conception and is today a practical reality is because one man in our organization had a vision, and he spent five years and a quarter of a million dollars in bringing that vision to a reality.

As an illustration of one or two fabrics, that we have developed in the past two years—suppose I said to the best weaver in this room, "Can you take an ordinary dobby loom and make a pleated dress goods or pleated gingham or just a pleated sheeting with the pleat woven in so that a girl, who many times has glued her eyes to the windows of a department store, and wanted so badly a pleated skirt but could not afford one because it cost four or five dollars to have it dry-cleaned and re-pleated, can now realize the benefit of that pleated skirt by washing it and ironing it at home?" Would you say it could be done? Yet that is one fabric we have developed, and placed it before the best weavers in this country, and they said it couldn't be done. Can you weave any fabric with no crimp or undulation in the warp, with the filling laying on the top and bottom? Can you weave the heaviest piece of duck, that you might imagine, that will be as pliable as a handkerchief, and pull the warp in it and it has absolutely no crimp in it?

I could go on and tell you for two hours of the fabrics, that have been made in this plant, but one or two illustrations are sufficient to show what can be accomplished by concentrated energy on one unit in any part of the mill.

The toastmaster then called upon T. H. Rennie, manager of the Pell City division of the Avondale Mills, and a

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past president of the American Cotton Manufacturers' Association for a few remarks. In response Mr. Rennie indicated his pleasure at being present and said:

"I was very much interested in the discussion this morning for the reason that mill men are getting together, exchanging ideas, helping one another, trying to strengthen the weak points, and to do the best things in the best interests of their business.

"The cotton manufacturers 45 years ago didn't get together and exchange ideas," continued Mr. Rennie. "The prevalent idea in cotton manufacturing at that time was that it was a secret that should not be promulgated broadcast for fear of the competition it would make in the business. To illustrate—it is a personal illustration, but it illustrates the idea. When I was working in a mill in Lewistown, Maine,—this would be fifty years ago—a young gentleman came into the mill to learn the business, and he was being put through the different departments of the mill, and for some time he was in the department that I had charge of as third hand, as they called them in those days. He asked me many questions about the work, and I answered him carefully, and in the most particular manner because he was studying the processes. He asked me a question one day that I could not answer. I said, 'I have never studied along that line, but I think I will.' He came back in a few days, and he says: 'The agent of the corporation has not only answered my question, but he has given me all the figures and facts connected with that question.' 'Well,' I said, 'that is very interesting. Will you let me hear them'? He looked at me like I was a piece of dirty waste on the floor and says, 'That's not for the common help. We don't give things away like that.' Well, that was the prevalent idea among manufacturers in those days.

"Every man, who ran a slasher room—and there were only one or two then, the first slashers that came to this country were put in a room, and a partition built around it, and a man brought from England to operate the slasher, and he got five dollars a day in gold, and nobody was permitted to go into the room except he was accompanied by the agent of the corporation. But we did have old fashioned dressing in those days, and every dresser had his own formula for making size, which was a secret, and it was of no use to ask what it was. You would not be told. Every man had a special way of setting his cards to produce what he considered the best results, but he would not tell anybody what it was. The same thing went all through the business.

"Then a few men got together in Boston, in the manufacturing business, and commenced, as they said in those days, 'to swap ideas.' At first one man talked and they all listened. Then another man talked, and they all listened, but finally they all got to talking, and they all heard it. Today the idea among manufacturers is that there are no secrets in the business. It is all a matter of management, and, gentlemen, that is the idea that I would impress upon any body of men, that get together. The keynote of successful operation is all in the management.

"My friend from Monroe (Mr. Mears) spoke about the relation between the superintendent and the overseer. He should have gone further and stated also how the overseer should keep in touch with the help or the operatives. You know a mill without operatives is a very dead proposition. There is no more humiliating thing for the management than to go in and see the machinery standing idle for the want of operatives. It is more humiliating when your neighbors are running full. The question comes to a man then, 'What is the trouble with this plant? It cannot be the machinery. It is just as good as the other man's. It cannot be the cotton because it is the same kind of cotton. Then there is only one answer. It must be in the management.'

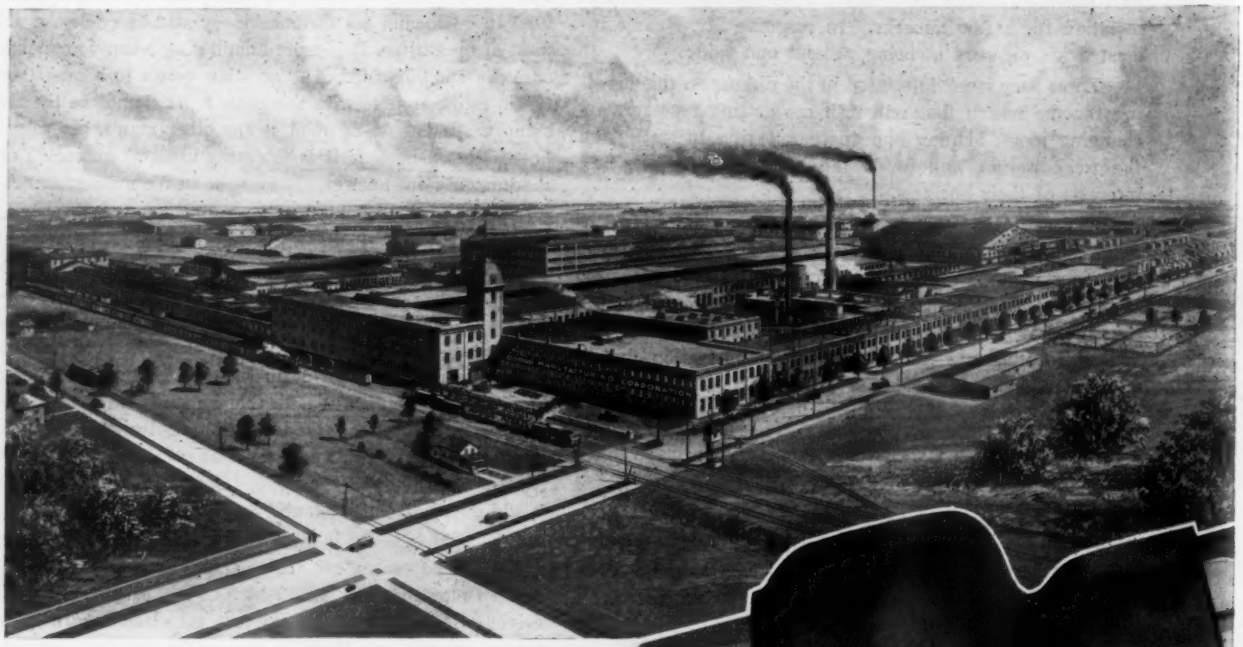
"What is responsible for, we might say, the most vital part of a cotton mill, the operation of a cotton mill? It is the cooperation of interests between the superintendent, the overseer, and the operatives. I can go into a mill I believe—I may be egotistical—and I can discover if cooperation does not exist. You can see it in many ways. You can tell whether a man takes pride in what he is doing or whether he does not. You can tell whether a man is careless or careful. You can tell by the condition of the mill what the management is. You know there is nothing more disturbing than to go into a mill, and find it, as the housewife would say, 'all cluttered up.'

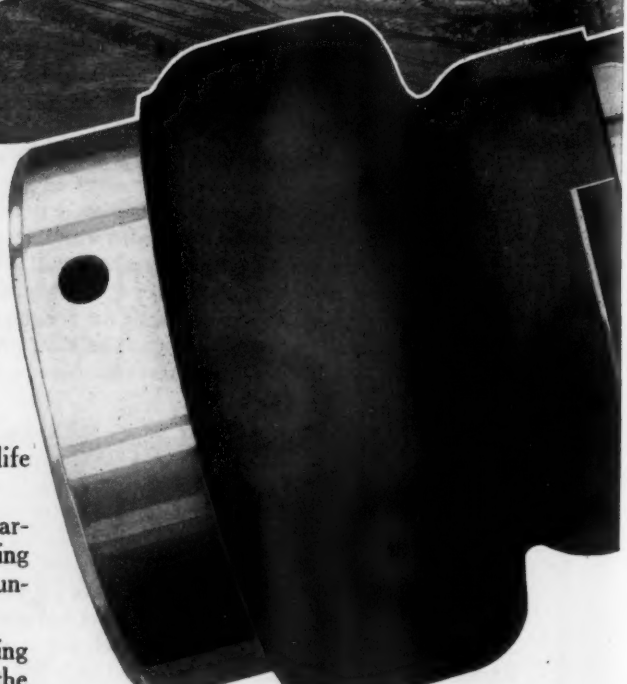
"Now, if it is not in good shape inside, the management is the one to blame, not the operative. The rank and file of men must be led. The rank and file of men cannot be driven. It is of no use to say to a man harsh words, when things are wrong. Talk it over with him, and see what caused this condition, and see why it cannot be ameliorated. If work is running badly, and the help are discouraged, there is a reason for it.

"I got my lesson, when I was 17 years old. It was during the dog days in a mill up in the state of Maine. I was under the overseer; I was the one that looked after this room. We were short of help. That happened fifty years ago, as it does today, and it was in August. The weather was hot, the air full of humidity, and the work in the carding department was not running as well as I had seen it run, and there was a girl there that was running intermediate frames, and she had two of them to run. She had taken on another frame to help out. Our orders were—and in the old days they used to be pretty strict about telling you what you had to do—that the room was to be cleaned every so often, and the machinery cleaned every so often, and it had to be done by a certain time. When this time came, this girl was as busy as fighting fire, but I was very young in those days. I didn't have as much consideration for the other fellow as I have today. So I went up and I said, 'Mary, didn't you know it was time to clean up'? 'Yes, Mr. Rennie, and I will do it as soon as I can.' I waited about fifteen minutes, and I went to her again, saying, 'Mary, you must clean up.' 'I cannot right now,' she replied, 'if it must be done right now, you will have to do it.' Think of my dignity! A girl talking like that to me, and me the man supposed to be in charge just at this moment! I went along then and I said, 'Go get your time.'

"She took off her apron, brushed herself, and went up to the overseer's office, and he handed her her time. He didn't question anything I had done to her, but after she was gone he motioned to me to come to the office. I went up, and he asked, 'Whom are you going to put on that machinery'? I said, 'I have not anybody.' He said, Neither have I.' He said further, 'Henry, anyone can discharge help. I have been trying in all my business experience to hire people that know how to work.'

"Well, I was not very dignified when I got out of that





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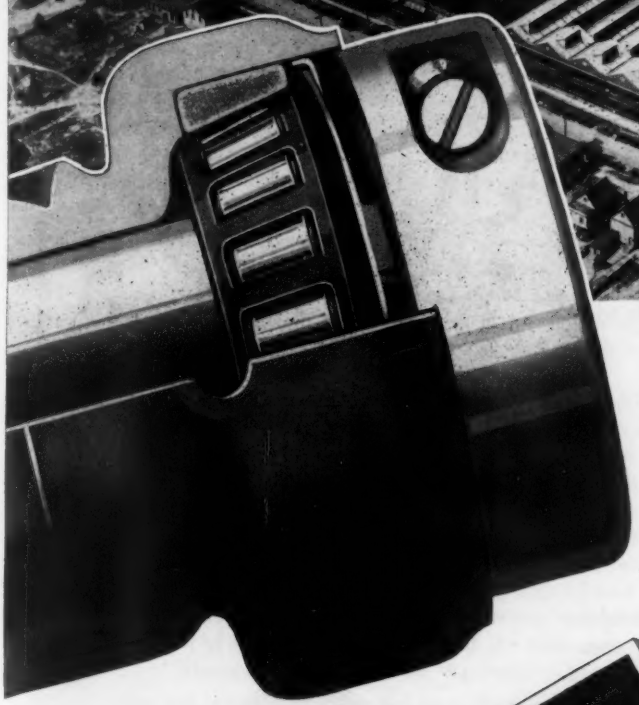

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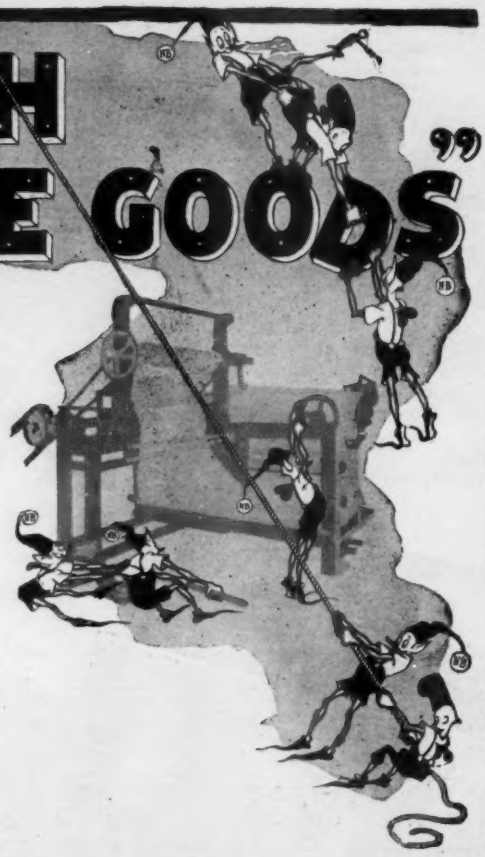

(Scene: Any retail store. The clerk is trying to interest a hard-to-please customer.)

Clerk: Now this cloth has a better finish.

Customer: Yes, it is beautiful. I'll take it.

Only the words are imaginary—the scene itself is being enacted daily in thousands of stores. The number of sales influenced by the *finish of the goods* amounts to a huge percentage of the total.

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office. I was not as big by six feet; I felt miserably small. I never made an answer though. I turned around and walked out. At dinner time instead of going home I went around to the girl's boarding house and called for her to come to the door. I said, 'Mary, I lost my temper this morning, and I did a very foolish thing. If you will overlook that and come back to work this afternoon you will confer an everlasting favor on me.' She said, "Here, take this time back, and I will be back after dinner.'

"When the overseer passed through the department after dinner the frames were running; he saw Mary; and then he turned and looked at me, but never said a word. Now I am going to make a statement that may sound odd. Mary was the last person I ever discharged, and I have been at it fifty years. It has never been necessary in my experience from that day to this to discharge an operative out of a cotton mill. I don't know whether you call that management or not, but I have always been able to get results by kindness, courtesy, helpfulness, advice, and other things, chief among which is to 'do unto others as you would have them do unto you.'"

The concluding speaker at the luncheon was George S. Harris, president of the Cotton Manufacturers' Association of Georgia and of the Exposition Mills of Atlanta. He congratulated the members on the work they were doing and told them that the association he represented was thoroughly in sympathy with them in their work.

Mr. Harris then pointed out where the operating executives could help their mills very materially by urging the operatives to be careful and prevent accidents. The premium rates for the mills, under the Georgia Workmen's Compensation Act, have been unduly increased by the "experience" of the insurance underwriters during the last period. He pointed out that the cooperation of the overseers in his mills had greatly reduced the number of such accidents and he believed that perhaps something could be accomplished in some of the other mills of the state.

Afternoon Discussion on Weaving.

After the luncheon, the men remained in the grill room for the afternoon session, which was occupied by a discussion on weaving, led by Hal Riviere, superintendent of the Eagle & Phenix Mills, Columbus, Ga. The first question considered was, "Is it absolutely satisfactory to have a so-called 'feeler man' in a weave room?" Called upon, Frank Dennis, manager, Consolidated Textile Corporation, LaFayette, Ga., said that, "It is our opinion that it gives the fixers an idea that they are relieved of part of their responsibility. We try to fight against dividing responsibility throughout our entire organization. We feel that it is better to have a loom section of such a size so that the loom fixer can look after everything about that section. It would be directly opposite to our general plan of organization to use a feeler man."

Mr. Martin, of Griffin, said that "we do not employ a feeler man as we work it through the overseers with the fixers. I can see where it might be a good thing to have a feeler man to devote his entire time to setting the feelers, but that expense can be dispensed with if you have an energetic overseer who can work this matter through the fixers. The fixers will take a great deal of pride in setting the feelers right if you will keep track of the waste on each section. Over a year ago we found we were making excessive waste in our weaving mill, and we set about to right this matter, and through the efficiency and energy of the overseer, and talking it up with the fixers and putting them on their honor, and keeping track of the waste, we succeeded in reducing our waste to what we would call normal. So answering this question I might say that in some cases it might be well for a feeler man to train the fixers, in other cases it can be worked through the efficiency of the overseer."

Mr. Rennie approved the idea of having a feeler man. "I have been using a feeler man for fourteen years," he said. "Adjusting a feeler properly, and keeping it adjusted, not only reduces waste, but if you are making specialties, it reduces seconds materially. The expense of a feeler man is nothing. We put on a feeler man after we had exhausted every other means of trying to reduce waste and reduce second quality goods.

"We make, entirely, indigo denims, and it is quite surprising how particular the cutters of denims are in regard to the quality of the goods. By putting on a feeler man, we made an expert out of that one man, and he increased the efficiency of the feelers and reduced the waste. It is not a matter of whether it is 'entirely satisfactory'; I think it is a matter of 'economy'."

"Have you had any friction with the other fixers?" asked Mr. Riviere. "We have not," was Mr. Rennie's reply. "There is no friction between the section men and the feeler man; he is an experienced section man and if he discovers anything about the loom that needs attention he advises the section man. He must visit everything six times a day, and if he finds anything wrong with the loom he notifies the section man, and we find no tendency on the part of the section men to shirk. If the section men discover a feeler that is knocking, they notify the feeler man immediately. We do it to save waste and help the quality of the goods."

"How many looms does he take care of?" was Mr. Riviere's next question. "742," answered Mr. Rennie.

The next question was from Mr. Thornburg, "Mr. Rennie, do you use a bunch builder for those feelers?" "No, sir," was the reply; "we put on our own bunch."

Mr. Barnes at this point asked Mr. Martin to explain his method of keeping up with the waste to which he had referred. "The proper way of keeping up with the waste in a weave room is to weigh it against the weaver," responded Mr. Martin. "Find out what is making it, who is making it, where it is made. There are several things to take into consideration. First, how the waste is made; how much is there of it; why is it made; where is it made; who makes it; and who is responsible. All these things come into consideration.

"One mill—not mine—has a man in charge of the waste who does nothing else. He has waste stations all through the mill. He knows who makes the waste, at what machine the waste is made, why it is made, etc. And he follows the waste right into the waste house.

"One great trouble with us is that we spend a great deal of time in the finishing and cloth rooms, and do not look after the waste as closely as we might. Any overseer or superintendent can spend a day very profitably in the waste house. Why I found a whole bolt of cloth out there the other day. I was going down on the elevator and noticed that the box of waste that the negro was taking out was covered with paper, and I looked in and found some bolts

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of cloth. It is worth while to look into the waste even if it is only a quarter of a pound."

Mr. Petrea here asked Mr. Rennie what type of feeler he used and was told it was the sliding type.

The next question was, "In a mill where the cloth is inspected by a cloth inspecting machine, how many looms, weaving about 50 yards a day, should one inspector take care of for close inspecting?" This, it seemed, was misinterpreted by the men sending answers to the secretary as meaning the inspectors in the cloth room, while it was intended to refer to the preliminary inspection made in the weave room by some mills. On this basis, said Mr. Riviere, it seemed that it was considered that a good average would be about 150 to 200 looms per inspector.

The matter of a premium on quality and production was next taken up. S. W. Engram, overseer of weaving, Monroe Cotton Mills, was asked for his opinion, and responded, "We have three prices, one for each grade of goods. If a weaver gets 95 per cent production we give him the top price. If he gets 90 per cent we give him a price that is 7 points under the top price, and under that, we pay 9 points less."

R. S. Steele asked his overseer of weaving, Mr. Hyde, to explain their plan. "The weaver that gets off the best production gets $1.50 bonus, and the second best we give $1.00," said Mr. Hyde. "The loom fixer with seconds under three per cent gets five dollars and those with seconds under five per cent get $3.00. These are paid per week."

C. J. Strother, of Shawmut, said that they have a premium system "that goes back to each individual weaver and to the fixer and second hand, for production and quality. Not only do we pay a premium for production and quality, but we pay a premium for saving. We arrived at a figure by taking a number of years and figuring what would be a reasonable and just minimum amount to spend on each section and used that as a base, and pay the fixer who 'beats' that record that he has to work against. We have three or four grades of cloth; of course if there are weaving defects the weaver doesn't get any pay, but we pay first price for grade A, and so on. The production of the section is graduated from what is taken as the minimum or base."

"For the past two years we have been using both a quality bonus and a production bonus," said W. L. Phillips, of Social Circle. "For a while we paid it to the loom fixer; for instance, the loom fixer that got the best production with the least number of seconds we gave $4.00, next $3.00, next $2.00, next $1.00. Then on top of that the fixer that used the least amount of supplies we gave $1.00. But it finally developed to a point to where two of our best men got the premium every time, and we found that they used less supplies but they were running the sections down. When I put another man on it he had to replace all the patched work, and we found that after all we were paying out more money than we would without the bonus.

"We now use a different system, with our weavers. We have three different prices we pay in our weave room. We have a base price. If a weaver makes 95 per cent production, and runs from two to four per cent seconds (we make wide sheetings; that's why that sounds high) we give him this price; if he gets from four to five per cent, we pay him five per cent less; from five to six per cent, ten per cent less. If it goes below that—well, we do something else with him.

"But if a weaver gets less than one per cent seconds on

a 95 per cent production, we pay him ten per cent above the base price; if he makes less than two per cent on 95 per cent, he gets five per cent bonus. We think this plan works out all right."

Mr. Sorrells, of Gainesville, asked Mr. Phillips whether there was any conflict between the people in the other departments, whether they were disgruntled because they, too, did not receive a bonus on good work. Mr. Phillips said that they had never paid bonuses in other departments—neither had they docked.

"Wherever you find a good running weave room," said D. G. Reid, of Hogansville, "you will find a good carding and spinning department. And a bad running weave room is usually the sign of a bad running carding and spinning. Good carding and spinning has just as much to do with keeping down seconds in the weave room as anything else; I am opposed to the premium for loom fixers unless you give it to everybody."

"What is an average filling waste on goods where mispicks, broken picks and thin places must be prevented on your numbers of filling, Draper looms with feelers attached?" was next asked.

"In a mill of nearly 5,000 looms where the waste was excessive, very excessive, we cut it down, by the effort previously mentioned, to two ounces per loom per week, on 25s to 35s yarn," said Mr. Martin.

"We have been making some tests in the past few weeks," said Mr. Steele, "but we can't do that well, on 22s warp and 26s filling. We got .61 of a pound per loom per week." On 3½s filling, Mr. Riviere said the best they had been able to do was two per cent on the amount of the filling used. "When we got under that we had too many mispicks," he said.

Some answers made to the next question—"What is the best way to avoid and overcome hanging threads that are drawn in from the battery end while weaving?"—were: "Too much tension on the filling in the shuttle will cause the thread to slip out of the filling knife guide and fly into the cloth." "Sometimes there is not enough tension on the filling knife guide to hold the thread after the knife cuts it. This will also cause loose threads to get into the cloth."—"Shuttle feeler knife does not hold filling until the temple knife cuts it. When it lets go, the next pick jerks it in."—"To avoid hanging threads from the battery end, have a deep bobbin can and do not let it get even half full so the bobbin will drop far enough to keep the thread tight. See that the shuttle protector is set right. A piece of card clothing on the side of the lay will help. If the reed space is filled up with the width of the warp this will cause it sometimes."

The brief discussion on the next question—"In running a heavy sley goods (four up and one down) which is better, a quick or a slow changing cam?"—favored the quick changing cam, it being pointed out that this quick action eliminates kinky warps and loops in the goods.

The last question on the weaving questionnaire was with regard to loom speeds, and Mr. Riviere summed up the answers as indicating a general preference for a speed of about 160 to 165 on 30-, 32,- and 36-inch looms.

Another question brought up at the close of the meeting was how to increase the stockiness of a 28½-inch, 8-ounce army duck without changing the construction. A suggestion from R. M. Matthews that the man desiring this try raising the whip roll brought the discussion to a close and the meeting was adjourned. The next meeting, it was announced, will consider carding and spinning, and will be held in Atlanta some time in March, 1925.

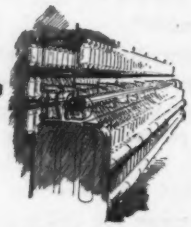
Towels and Toweling.

(*Continued from page* 1244.)

The Devon huck weave is complete on 10 threads and 6 double picks, as shown on the point-paper plan at Q in Fig. 68. The weave may be regarded as the simplest form of huckaback. The weaving plan is complete on 4 threads and 6 picks; alternative forms appear at R and S in the same figure. Weaving plan R is used in conjunction with the draft T, and has the advantage of placing the plain threads on the two front harnesses. Nevertheless, weaving plan S is almost invariably used in practice, along with its corresponding draft U, which is distinctly known as the "huckaback draft."

An examination of the draft U will show that all the odd threads in the repeat, i. e., the 1st, 3rd, 5th, 7th and 9th threads, are carried by the two front harnesses; while the even threads, i.e., the 2nd, 4th, 6th, 8th and 10th threads, are controlled by the two back harnesses. If and when it is desired to change over to plain weave, as often happens in order to make cross borders in towels, it is an easy matter to make the front two harnesses weave together, i. e., one down and one up, and, similarly, to cause the two back harnesses to weave together, i. e., one up and one down. In positive tappet looms of the Woodcroft type, this change of weave is effected by changing the cords from the 2nd and 3rd treadles to the 1st and 4th treadles respectively, provision being made to enable the weaver to effect this change easily and quickly. In dobby looms, the cards or lags are cut or pegged to produce the same effect. The harnesses may be used in an ordinary plain tappet loom by coupling 1 and 2 together and 3 and 4 together, and then actuating the two pairs by the two plain blades of a tappet.

The samples exhibited in Fig. 67 contain 44 threads per inch and 30 double or 60 single picks per inch. As previously mentioned, the filling for this class of huck is invariably inserted as a doubled yarn without twist or with very little twist. The filling may be prepared on any suitable form of twisting or doubling frame by running two threads together, say with the minimum amount of twist, after which the prepared twist yarn is put into cop, pirn bobbin, or half-pirn form, ready for the shuttle. More frequently, the double filling is prepared by winding the material direct from two separate hanks or bobbins at the cop winding frame or at the pirn winding frame. The better plan of the two is to wind from two warping bobbins upon which the yarn from the hanks has been previously wound. Great care is neeessary in the winding to avoid single yarns. This can be avoided in the twisting frame by using an automatic thread stop motion for each thread. Occasionally, the shuttles are arranged to carry two small cops or pirns, but here, again, there is the danger of one filling breaking or running out, and a fault would result unless each cop or pirn had an electric attachment to cause the loom to stop on the breaking or exhaustion of either filling. Because of this use of double filling, the Devon huck is capable of yielding almost the same effect as an ordinary



A Typical Hank Counter Installation.

Does This Happen To Be You?

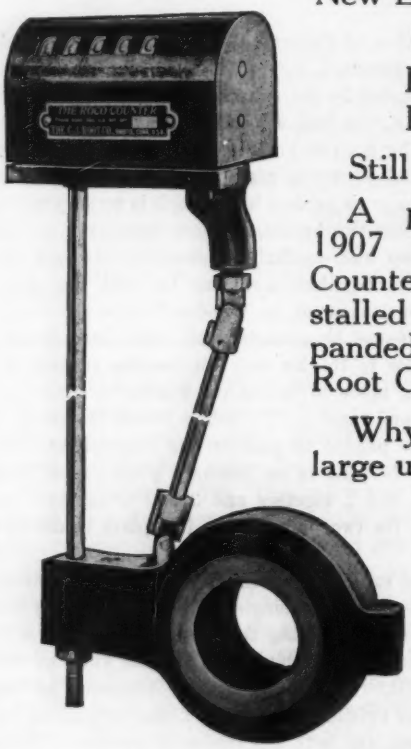
One of the large, well known blanket mills (name upon request) in New England tried out

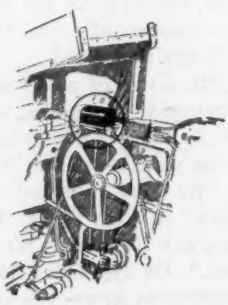
1 Root Counter in 1920
In 1921 they bought 531
In 1922 they installed 1293

Still another case—

A prominent bleachery, since 1907 when they tested four Root Counters, have from year to year installed them as their business expanded until today they total 1016 Root Counters.

Why don't you try one out as other large users have done?





A Typical Pick Counter Installation.

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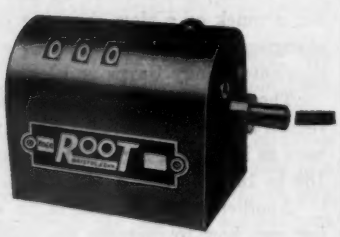


huck, and in three-fifths of the time, i. e., in the ratio of 6 picks to 10 picks.

In linen, this class of huck is often woven in a 900 reed with 5 double picks to the 37/200-inch glass from 18 lea half-bleached or three-quarter bleached warp and filling. The following are the results obtained by analysis from a comparatively light sample of Devon huck:

Weight of fabric .....5 ozs. per running yard
Count of warp .....30 leas per lb., or 30s
Count of filling .....25 leas per lb., or 25s
Sett of warp .....58 threads per inch
Sett of filling .....28 double picks per inch
Finished cloth width .....25 inches
Reed width for 25-inch cloth .....27 inches
Laid length of warp .....108 yards
Finished length of cloth .....100 yards

Both warp and filling are three-quarter bleached yarns.

(*To be continued.*)

Human Relationships in Industry.

(*Continued from page* 1246.)

5. Can the cotton mill business be charted to show the various lines of promotion possible? Why?

6. Do you think such a chart would be of value? Why?

7. Should a man be promoted because he is an excellent workman? Why?

8. To what extent would loyalty be considered?

9. To what extent would leadership or ability to control men be considered?

10. Have you ever lost a good man through failure to promote him? Why did you lose him?

11. When several are applicants for promotion and only one can be promoted, what should you do about those who fail to get promoted, to make them satisfied?

12. Should an overseer recommend a man in his department to an overseer in another department?

13. How should this matter be handled?

14. Who is the final judge in a promotion system?

15. Do you think an artificial or mechanical system could be outlined which would work automatically and relieve the overseer or superintendent of this responsibility? Why?

16. Name some of the general fundamentals which would constitute a part of your basis for promotion.

17. Chart out the possible lines of promotion in your department and as far as possible indicate qualifications for promotion.

18. Do you like ambitious workers? Why?

It seems to me that some system of promotion or seeming promotion should be a dominant characteristic of every industry. In the discussion of the subject it must be kept in mind that there can be transfers and promotions within the department as well as to other departments. Also, there can be transfers and promotions to more desirable jobs or jobs with more or less responsibilities. In discussing this we must not let the wage idea dominate. It is discussed with the idea of trying to use these two means to develop a healthier and more efficient and better satisfied group of workers.

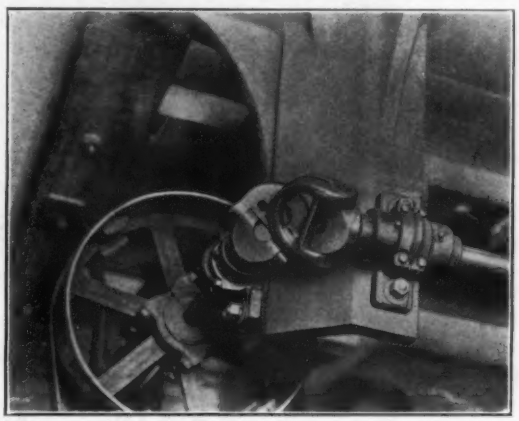
It is discussed with the idea of devising ways and means of caring for the many types of workers that are employed in our factory.

If a plan of transfers and promotions can be developed in a satisfactory manner, I believe it will make for loyalty, appreciation of self, appreciation of the executives, and a splendid spirit of cooperation in all lines.

What do you think about it?

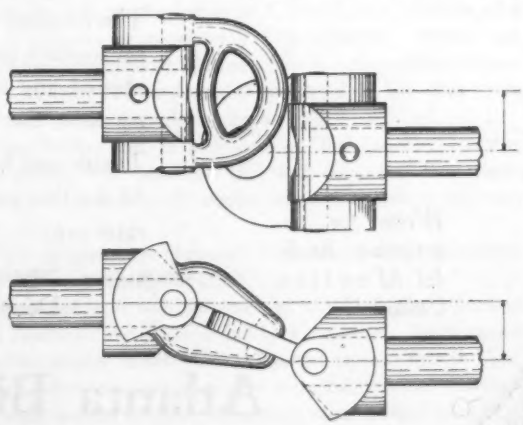
A New Device for Angular Transmission.

An unique angular transmission that has a number of applications is shown in the accompanying illustrations. Its chief use is for operation at an angle, connecting two shafts, although another advantage pointed out for it is that it can be adapted to mal-aligned shafts without creating additional pressure on the bearings or on its own working



parts, and that it will transmit motion between two parallel shafts whose center lines are some distance apart. It is designed to be substituted for miter or bevel gears, and where these would be prohibitive on account of imperfect shaft alignment, it has another application. Being positive, requiring less space and attention, it is offered as a substitute for a mule pulley.

The driving elements having a continuous sliding motion under pressure, and there being no clash due to a succession



of teeth coming in contact, the transmission operates noiselessly.

The drives are made in a series of standard sizes, each covering a limited range of shaft diameters. The mechanical principle involved is covered by basic patents. G. M. Bartlett, 2533 College Avenue, Indianapolis, Indiana, is marketing the product.

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The Insoluble Azo Colors

BY WILLIAM B. NANSON.

The developed dyes, as their name implies, are developed on the fiber by the interaction of the constituents which produce them. They are often called the "ice" colors and are produced on the cotton fiber by the interaction of some second component (with which the fiber has been impregnated) with a solution of a diazo salt cooled with ice.

In order to produce insoluble azo-colors, the fiber has to be first impregnated with a phenol dissolved in caustic alkali. Beta-naphthol gives the most satisfactory results, and is, therefore, chiefly used in practice. The color is developed by passing the impregnated cotton through the solution of a diazotized amine of the aromatic series (diazo compound).

Para-nitraniline and alpha-naphthylamine are chiefly used in cotton dyeing, while chloro-anisidine, dianisidine, etc., are less frequently employed.

The beta-naphthol colors are fast to alkalis and to washing; they do not bleed. With the exception of dianisidine blue they are fast to acids. Their fastness to light is fairly satisfactory, and in most cases superior to the substantive dyestuffs. The dyeings always rub more or less, especially if the necessary care is not taken in the dyeing. When heated to a high temperature, the colors volatilize slowly. The naphthol itself shows this property, and the drying of the cotton which has been prepared with the beta-naphthol solution at too high a temperature, or allowing the material to be in contact with the surface of the drying cylinders for too long a time, may, at times, cause some of the naphthol to volatilize, which will, when developed, make for cloudy and uneven and generally unsatisfactory results.

The *fastness* of the insoluble azo colors may be improved by an after-treatment with metallic salts, especially copper salts, but the lake formed is not very stable; it is decomposed by the action of acids or alkalis. The shade of the color is considerably changed by this after-treatment. Para-nitraniline red after-treated with copper sulphate gives a brown. In the case of dianisidine blue an after-treatment with copper salts is necessary in order to convert the unstable reddish blue into the useful blue which is fast to washing and to light but not fast to acids. A copper salt may, in some cases, be added to the developing bath, or to the naphthol solution.

The production of an insoluble azo dyestuff in the fiber was first achieved by F. and R. Holiday, who impregnated the fiber with alpha or beta-naphthol, passed it then through a diazo solution, and, finally developed the color by treatment with an alkali. An improvement on this process, however, introduced by Lucius and Bruning in 1889 which consisted in "padding" the cotton piece goods with the sodium salt of a phenol (usually beta-naphthol) drying carefully, and passing the cloth through a diazo solution the free mineral acid of which has been neutralized by adding sodium acetate. This process is very largely used at the present day, and is applied to the greatest extent to the production of the so-called "para" red (the azo color obtained by combining diazotised para-nitroaniline with beta-naphthol).

Paranitraniline red is prepared by combining diazotized para-nitroaniline with beta-naphthol in alkaline solution.

As stated, it is now almost entirely produced on the fiber. The goods are soaked in a bath containing sodium beta-naphthol and Turkey red oil, or sometimes thickening materials with a little tartar emetic. They are then passed through the diazo-solution, washed, and soaped. In order to avoid preparing the diazo solution in the dyehouse, various preparations may be used—thus, paranitraniline extra N paste is a mixture of p-nitroaniline with the calculated amount of sodium nitrate necessary for diazotation and needs only to be stirred slowly into the necessary quantity of hypdrochloric or sulphuric acid, ice, and water to produce the diazo solution. A similar product is benzonitrol paste. Other preparations contain the diazo-compound in a suitable form for keeping. Thus nitrosamine red is the sodium salt of para-nitroantidiazobenzene(which is very stable) and furnishes the true diazo solution when mixed with dilute acid. Azophor red, azogen red, and nitrazol C are mixtures of the diazo-sulphate with sodium sulphate (whereby sodium-hydrogen-sulphate is produced); they are dissolved in water, the solution filtered, if necessary, and neutralized just before using with sodium acetate or hydroxide.

Paranitraniline red is used as a substitute for the red Congo dyestuffs and for Turkey red. It is extracted from the fiber when treated with organic solvents, and when the fiber is heated to 180 to 200 degrees C. the dyestuff partly sublimes.

Meta-nitraniline orange and nitro-o-toluidine orange are prepared as above from diazotized meta-nitraniline or nitro-o-toluidine and beta-naphthol. The former gives yellowish and the latter reddish shades of orange. Their use is not very extensive, as they are not fast to rubbing, and the colors sublime on keeping. An orange free from these disadvantages can, however, be produced by using meta-nitrophenetidine.

Nitro-phenetidine rose or blue red. In this case orthonitroparaphenetidine is used as the diazotized base. A substitute for this is azophor rose A, which is a mixture of a "stable" diazo-compound with beta-naphthol. Other rose shades are produced by the use of para-nitro-orthoanisidine.

Naphthylamine bordeaux is prepared on the fiber from diazotized alpha-naphthylamine and beta-naphthol.

Azo Turkey red is produced on the fiber by treating cloth padded with beta-naphthol with diazotized beta-naphthylamine. It is a bright scarlet which, however, is not very fast.

Fast azo garnet is prepared from diazotized ortho-amino-azo-toluene and beta-naphthol.

Benzidine and tolidine puce is prepared from tetrazotized benzidine and tolidine and beta-naphthol. Dark garnet to brown shades result which, however, are not fast to light. Rather yellower shades result by using tetrazotized diaminocarbazole instead of these diamines; when treated with copper salts the tints are very fast to light.

Dianisidine blue is produced when tetrazotized dianisidine is combined on the fiber with beta-naphthol in the presence of copper salts. The tetrazo compound is also put on the market as azophor blue D, a mixture of the tetrazo compound and aluminum sulphate which has been dried in a vacuum at 45 degrees C. The color is very fast to light,

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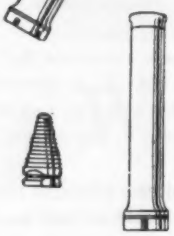

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soap and rubbing.

The production of black insoluble azo colors in the fiber may be carried out as follows: The cloth is padded with beta-naphthol and gum tragacanth and treated with a mixture of the tetrazo compounds of dianisdine and certain other bases. The mixture of bases sold for this purpose are known as azo black, base O, and the diazo-compounds are put on the market under the name of azophor black S. There is a black obtained by passing the cloth with 1 : 6 or 1 : 7 aminonaphthol, and then passing it through diazotized para-nitroaniline so as to form the disazo-coloring matter. The amino-naphthol is put on the market as amidonaphthol BD and 3B and both brands are mixtures of the two aminonaphthols mentioned. Full black colors are obtained which are fast to soap and chlorine, but they are not very easily applied in printing. A black also is produced from azotol C, which is an asymetric, di-alkilated di-paradiaminoazobenzene. The base is diazotized and combined with beta-naphthol on the fiber in the usual way. There has also been introduced the use of the diazo-compound of amino- chrysoidine, and of the tetrazo-compound of pp-diaminodiphenylamine for the production of black colors. Other tetrazo-compounds recommended are those of aminobenzene-azo-alpha-naphthylamine, and diamino-dimethylcarbazole.

Another process of producing insoluble azo-coloring matters on the fiber is by the use of primuline. When cotton dyed with this dyestuff is treated with a solution containing hydrochloric acid and sodium nitrite, the dyestuff is diazotized. The cloth is now passed through a bath containing a "developer" consisting of a solution of an amine or a phenol; beta-naphthol is mostly used in giving ingrain or primuline red. An orange color is obtained with resorcinol (ingrain orange) and a brown with metaphenylinediamine. Many direct dyeing cotton colors which contain a diazotizable amino group (such as diamine black BH) acquire a faster, deeper and modified shade when similarly diazotized in the fiber and developed with beta-naphthol or meta-phenylene-diamine.

It might be as well, at this point, to describe a little more fully the various compounds (anilines) used in producing the foregoing colors.

Paranitraniline is a derivative of benzene. The benzene is converted into nitrobenzene by nitration with nitric acid and sulphuric acid. The nitrobenzene is converted into aniline by reduction with hydrochloric acid and iron filings and subsequent distillation. The aniline is converted into acetanilide by boiling with glacial acetic acid and subsequent filtration and drying. The acetanilide is converted into paranitracetanilide by nitration with sulphuric and nitric acids, filtered, washed and dried. Paranitracetanilide is converted into paranitraniline by boiling it with 25 per cent dilute sulphuric acid until the whole dissolves. The clear solution is poured into a vessel, and the free base precipitated by adding dilute caustic soda solution until alkaline. After cooling, the paranitraniline is filtered, recrystallized from hot water under pressure and dried.

Paranitraniline crystallizes in yellow needles or prisms, it dissolves into 1,250 parts of water at 18 degrees. The commercial product should be a light yellow powder, having the correct melting point (147 degrees C) and dissolving without residue in hydrochloric acid.

Alpha-naphthylamine is derived from naphthaline, one of the constituents of the middle and heavy oils distilled from coal tar. By nitration with nitric and sulphuric acids (similar to benzene) naphthalene is converted into alpha-nitronaphthalene. After settling and drying this alpha-nitro product is converted into alpha naphthylamine by reduction with iron and hydrochloric acid as in the case of the nitrobenzene reduction.

Alpha-naphthylamine is nearly insoluble in water, and possesses a very disagreeable smell. It forms greyish white lumps. It should have the correct melting point (50 degrees C.) and dissolve almost completely in dilute hydrochloric acid.

Beta-naphthol ($C_{10}H_7OH$) is a phenol made from naphthalene; both the a and b naphthols are prepared from naphthalene sulphuric acids, or naphthylamines; a-naphthol melts at 95 degrees C. and boils at 282 degrees C.; beta-naphthol melts at 122 degrees C. and boils at 285 degrees C.; the latter is more soluble in water. The naphthols are true phenols, but they resemble the alcohols more than they do the benzene phenols.

The introduction of the hydroxyl group in the naphthalene series is brought about by fusing the sulphonic acid with caustic soda. Thus the alpha- and beta-naphthol sulphonic acids give alpha and beta-naphthol when fused with caustic soda. Like phenol, both a- and b-naphthol are weak acids and react with caustic alkalis, forming stable alkali salts.

Hence it will be seen that to make a- or b-naphtha the crude naphthaline is first sulphonated by heating 12 hours along with concentrated sulphuric acid, the result is neutralized with lime, crystallized, washed, redissolved in soda solution, filtered, etc., and crystallized. This sulphuric acid forms non-deliquescent plates. Beta-naphthol is produced from this sodium naphthalene-b-sulphonate by fusing with caustic soda. About 100 parts of the b-acid take about 300 parts of caustic soda. After fusion the mass is dissolved in water and the naphthol precipitated with hydrochloric acid, washed, dried, etc., and distilled *in vacuo*.

The result is a colorless, crystalline solid, difficultly soluble in water (in 1,000 parts cold and 75 parts boiling) but easily soluble in organic solvents.

Dianisidine is prepared from one of the nitro-derivatives of benzene, 4-4 diamine, 3-3 dimethoxydiphenyl NH_2-$C_6H_3(OCH_3)C_6H_3(OCH_3)NH_2$. It forms colorless leaflets with a melting point 131.5 degrees C.

Para-nitraniline Red (Para red).

The beta-naphthol solution: Dissolve three pounds five ounces beta-naphthol in three pounds five ounces of caustic soda lye (77 degrees Tw.) and 4½ gallons of hot water, add 11 pounds Turkey red oil (50 per cent) stir and make up to 22 gallons. Castor oil soap may be used in place of Turkey red oil.

The bleached and dried goods should be padded once or twice through the beta-naphthol solution according to the thickness of the material and thoroughly squeezed in order to prevent an excess of the naphthol solution being dried on the surface of the goods, as this will cause the finished color to rub off. The goods may be dried (if piece goods) on the drying cylinders (not too hot) and the first four or five cylinders must be lapped with cotton cloth for it must be remembered that beta-naphthol is apt to sublime off if the heat is too great. Again, there must be no time lost between the padding and the drying, because the beta-

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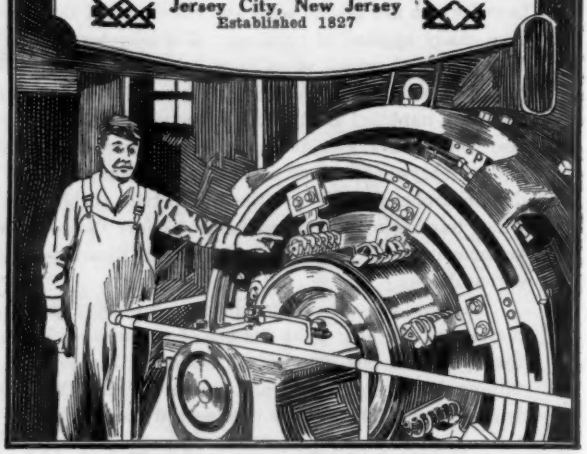

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naphthol quickly oxidizes if exposed to the air and turns brown, deadening the red so that the goods must always be dried as quickly as possible after padding and developed as quickly as possible after padding and drying.

An addition of tartar emetic to the beta-naphthol solution is sometimes made in order to prevent the impregnated cloth or yarn from turning a brownish shade during drying. A brighter red is thus produced. If a precipitate of antimony oxide should be formed in the solution, a little caustic soda may be added until the precipitate is re-dissolved. Please remember that in order to obtain a bright color with paranitraniline red it is necessary that the naphthol prepared cloth should retain its original white before it goes into the diazotizing bath otherwise a dull and uninteresting color will result. Beta-naphthol absorbs oxygen from the air and becomes brown.

Paranitraniline,

$$C_6H_4 \begin{matrix} NO_2 \\ NO_2 \end{matrix}$$

or its azo derivative is sold in different forms for the production of azo red upon the fiber. These are: 1st, parantitraniline (free base); 2nd, paranitraniline hydrochloride; 3rd, paranitradiazobenzene chloride; 4th, paranitrophenylnitrosamine.

No. 1 requires the addition of hydrochloric acid and nitrous acid; the second requires nitrous acid alone; the third of alkali; the fourth of acid.

Since it has been proved that paranitraniline red can be successfully dyed without the employment of ice, its application has very rapidly extended. To get along without the low temperature for which ice has been employed, the usual sodium acetate solution must not be added to the diazotized solution until the latter is required to be used.

Developing solution prepared with para-nitraniline C:

A. 2 pounds para-nitraniline C are dissolved in 1½ gallons of boiling water and a half gallon of hydrochloric acid. Stir until a complete solution is obtained. Stir this into about 3½ gallons of ice water and cool to 100-120 degrees F.; add 1⅛ pounds nitrite of soda dissolved in ⅝ gallon of cold water. In from fifteen to twenty minutes the diazotization of the para-nitraniline will be complete, when sufficient cold water is added to make up to 20 gallons. This is kept as a stock solution, and if kept in wooden or earthen vessels and not exposed to heat or light will keep for two or three weeks.

To make up the developing bath (just before using) add two pounds acetate soda to each 10 gallons of the developing solution; this is so as to neutralize any free hydrochloric acid that may be present. After this the goods are washed, soaped, washed and dried.

One drawback to the use of the so-called "ice" colors was the ready decomposibility of the diazo compound, which required the use of ice, but which has been obviated by the introduction of the azophor colors. These are acid diazo salts of the amines which are very stable without the addition of ice. The advantage of these compounds is, therefore, that no diazotization is required and that the ice for cooling can be entirely omitted. For instance, nitrazol and azophor red, which are diazotized paranitralines, are developed as follows, the beta-naphthol grounding being the same as for paranitraniline red:

A—17½ pounds nitrazol C are dissolved *at ordinary temperature*, in 5½ gallons of water and reduced with water to 16½ gallons.

B—1 quart caustic soda lye 77 degrees Tw. is diluted with 2½ gallons of water; this solution is mixed with 6½ pounds sodium acetate dissolved in 2½ gallons of water and made up with water to 5½ gallons.

The developing bath is composed of three parts of A and one part of B.

Azophor Red. When using azophor red in place of paranitraniline, two solutions A and B have to be prepared:

Solution A—4,500 grams of azophor red are mixed with 30 liters of cold water. For this purpose a barrel, with an outlet fitted with a removable plug immediately above the bottom, should be provided. The whole will be dissolved in one quarter to one-half hour. Allow to stand for one to two hours. Any insoluble matter will rise to the surface of the liquor. The clear solution is drawn off by the outlet at the bottom and filtered through a cloth strainer, the residue on the cloth and in the barrel is rinsed with ten liters of cold water, settled, drawn off and filtered as before, and added to the first clear filtrate, in this way we get 40 liters altogether of Solution A.

Solution B—2 to 2½ liters of caustic soda lye (22 degrees Baume) to 8 liters water. Make up to 10 liters.

When developing, slowly mix 40 liters of A while stirring with 10 liters of B. Stir until practically clear.

A developing bath containing 56 grams of azophor red and 14 grams of paranitraniline per liter has been found to give good results on a large scale, with the developing carried out as described.

Nitro-s-amine red paste may be used as a developer in place of para-nitraniline. For dark shades on cotton, eight pounds, two ounces of nitro-s-amine paste are stirred up with 3½ gallons of cold water; then add slowly three pounds, one ounce of hydrochloric acid at 32 degrees Tw., let the mixture stand for one-half hour, make up to 7½ gallons with cold water, and before using add three pounds, 12 ounces sodium acetate crystals.

Alpha-napthylamine Claret or Bordeaux.

A bluish red, which is fast to washing, acids, and alkalis, but only moderately fast to light, is produced with alpha-naphthylamine and beta-naphthol. The method of working is the same as that given for paranitraniline red, but the addition of Turkey red oil is not required. Alpha-naphthylamine claret is chiefly used on piece goods. The following instructions for dyeing may answer:

Beta-naphthol solution: 250 grams beta-naphthol, 500 c.c. caustic soda lye (22 degrees Baume), 750 grams tragacanth thickening (60 : 1000) made up to 10 liters.

Developing bath prepared with alpha-naphthylamine base: 143 grams alpha-naphthylamine base are dissolved in 3000 c.c. water and 100 c.c. hydrochloric acid, 22 degrees Baume) and 2000 grams of ice. Allow to cool to about 0 degree Centigrade, and add, while stirring, 260 c.c. of a solution of sodium nitrite (290 grams per liter). Immediately before using add 300 grams sodium acetate, and dilute with cold water to 10 liters.

The diazo-solutions prepared with alpha-naphthylamine salt S powder are more stable than those prepared with ordinary alpha-naphthyline—192 grams alpha-naphthylamine salt S powder are made into a paste with two liters of water and 100 grams of sulphuric acid 66 degrees Baume. Then add two kilos of ice. When the temperature of the mixture is about 0 degrees C., slowly run into it

while stirring 260 c.c. of a solution of sodium nitrite (290 grams per liter), allow to stand for 15 minutes, filter and add 300 grams sodium acetate and dilute with cold water to 10 liters.

Scarlet with Chloroanisidine P.

Diazotized chloroanisidine on beta-naphthol prepared piece goods produces a very brilliant scarlet, fairly fast to washing, light and bleaching. The beta-naphthol solution is prepared and worked in the same manner as given for para-nitraniline red.

The developing bath is prepared by dissolving four pounds, five ounces of chloroanisidine P in 11 gallons of water and three pounds five ounces hydrochloric acid, 32 degrees Tw. Warm until dissolved, then cool with ice to 40 or 50 degrees F.; add slowly, while stirring, a solution of one pound eight ounces to one pound nine ounces sodium nitrite in two gallons of water, and stir for 10 or 15 minutes. Shortly before using add a solution of 4½ pounds of sodium acetate in two gallons of water, and making up with cold water to 22 gallons.

Orange with Metanitraniline.

A brilliant orange, on cotton piece goods which have been prepared with beta-naphthol, may be obtained by developing with metanitraniline R. The method for working is the same as that given for para-nitraniline red.

Dianisidine Blue.

Dianisidine blue, azophor blue D, naphthol blue, is produced by coupling azophor blue D (diazotized dianisidine) with beta-naphthol.

The naphthol solution is made as follows: 250 grams of beta-naphthol, 500 c.c. caustic soda lye 22 degrees Baume, 100 grams of ammonia Turkey red oil, 150 grams sodium acetate crystals, made up with water to 10 liters.

Developing bath: Dissolve 250 grams azophor blue D in 8000 c.c. of water. Filter and thicken with 750 grams of flour thickening, then add 300 c c. of cupric chloride solution, 40 Baume, and 10 grams of chromic acid dissolved in water. Dilute the whole with water to 10 liters.

When a blue fast to perspiration is wanted, naphthol D is used for grounding instead of beta-naphthol. Naphthol D is a mixture of beta-naphthol with beta-oxynaphthoic acid.

The flour thickening is made like this: Mix 2100 grams wheat flour with 4500 grams water, then add 300 grams gum tragacanth, water (60 : 1000) and 450 grams acetic acid eight degrees Baume; boil a half hour.

The cupric chloride solution is made like this: Dissolve 240 grams of solid chloride of copper in 500 grams of water, then dissolve separately 64 grams acetate of copper in 600 grams of hot water; when both solutions are cool mix them and add 100 grams of acetic acid eight degrees Baume, and 120 grams sodium nitrite, and fill up to one kilo 500 grams with water.

Ammoniacal castor oil soap is prepared by slowly heating five kilos of castor oil with 2400 grams of soda lye at 38 degrees Baume to the boil and adding, after complete saponification (in about two hours) 25 liters of warm water and 1500 grams of hydrochloric acid at 21 degrees Baume. The fatty acid precipitated is once washed with water and then with a solution of common salt until the washing water is neutral, a five per cent salt solution answers completely. After sufficient washing the fatty acid is siphoned off and neutralized with 750 grams of ammonia; the neutralization is carried out until a sample will dissolve clearly in water. Under the name of soluble oil there are reliable castor oil ammoniacal soaps on the market.

The copper salt in dianisidine blue is necessary to convert the otherwise unstable reddish blue into a bright, useful blue which is fast to washing and light, but not fast to acids. The addition of the chromic acid, however, increases the fastness of the color to acids very materially.

Other colors which are, however, of minor importance, may be produced on the fiber by grounding with beta-naphthol and developing with the following bases:

With Beta-naphthylamine ...Red
With Azophor orange .....Orange
With Azophor pink .....Pink
With benzidine .....Maroon
With amino-azobenzene .....Red
With aniline .....Orange Yellow
With nitrosamine pink .....Brilliant Scarlets and Pinks
With tolidine .....Claret

Cotton in Australia, by Richard Harding. 270 pages, illustrated. Price, $4.20 per copy net. Longmans, Green & Company, 55 Fifth Avenue, New York City, publishers.

This book, a thorough and comprehensive study, was written "to demonstrate the tremendous cotton-growing possibilities of Australia," and "to prove by the pertinent statement of facts, or by comparisons with other countries, to what a vast extent great areas of Australia are adapted by climate and rainfall to commercial cotton production."

While efforts at cotton-raising in Australia have been made for the past half a century, no accurate records have been kept of the plant's behavior, furnishing no past experience upon which to base any predictions. The author, therefore, has made tentative suggestions based upon comparisons of climatic and other conditions between Australia and parts of the world where cotton is largely grown.

The book very evidently represents a tremendous amount of research and investigation. Its information concerning climate and rainfall, soils and soil analyses of different sections of the country, etc., make it a valuable reference book on conditions in Australia. It further discusses other factors entering into cotton production, such as transportation, marketing, etc., and its complete discussion of all phases of its subject has resulted in a most useful volume on a subject of especial interest to textile men. Copies of the book may be procured direct from the publishers or through Cotton's book department.

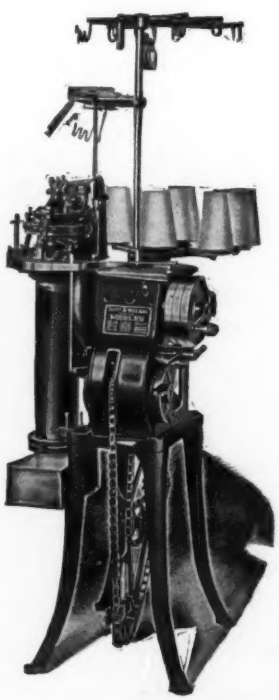
"The Property Owner's Handbook" is the title of a new 32-page booklet issued by The American Appraisal Company, Milwaukee. This booklet is a record of thirty-eight profitable uses of American appraisals over and above the usual major applications of appraisal reports as embodied in the requirements of insurance, accounting, finance, purchase and sale, and taxation. All of the material presented in this booklet has been gathered from the company's contact with its clients, and constitutes a collection of valuable suggestions which anyone responsible for the management of property will find of interest.

"The man who fails to read seldom makes progress in any line of endeavor."—Arthur M. Dixon.

KNITTING SECTION

NEW MODEL H-H

Producing Ribbed Top Half Hose Complete



Ribbed top made on two sets of needles.

Automatic transfer from ribbed stitch to plain.

Eliminating necessity of skilled help.

Saving of raveling waste which occurs when topped by hand.

Each stocking is dropped from the machine when finished.

Each stocking is automatically started upon the empty needles, producing a French welt without drawing thread or cutting, no ends of any kind to be removed.

Machine is fitted with five yarn fingers.

Provision is made for high spliced heel and double sole.

Provision is made for ring top and ring toe.

Needles without rivets or latches.

Speed of machine about the same as Model K.

Production about twelve stockings per hour on 3¾" 220 needles.

One operator can take care of the same number of machines as Model K.

The machine is built in all gauges.

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To Know NEW ENGLAND PRODUCTS Is to Buy NEW ENGLAND GOODS.

Or to be more explicit we suggest that you try a sample order of QUISSETT QUALITY yarn, and get acquainted with our product.

You may like us so well you will join the ranks and become a QUISSETT MILL BOOSTER.

We have many customers on our books today who have been steady customers since the mill started in 1910. There must be a reason for this.

WHAT IS IT?

Why not put in a trial order and begin to find out?

We spin ***your*** yarns and would like to show you what we can do.

Single and Ply yarns in all numbers from 3 to 100.

Any Twist Desired from American, Egyptian Cottons.

We buy early bloom Cotton for

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QUISSETT MEANS QUALITY

Should the Knitting Room Be Humidified?

Editor Cotton:

The subject of humidifying the knitting room is often considered. I should be glad to receive the opinions of some of your readers of "Knitting Kinks" as to whether there would be danger of the spring needles becoming rusty from the moisture, and would the table tops become rusty?

I shall be very interested to learn whether such systems are satisfactory where they have been installed in spring needle knitting rooms, and what advantages have been secured by having them. Also any suggestions with reference to this practice from those who have had experience in this connection.

C. S. (Mass.)

Knitting Machine Fixers.

Editor Cotton:

I have just been reading the letter of "J. L. H. (N. C.)" on fixing knitting machines, as published in "Knitting Kinks" in the July number. This is a good letter, and "J. L. H." shows that he's "been there," but still there is one point upon which I hardly agree with him. I am going to take advantage of your invitation to use "Knitting Kinks" to tell my idea on this, and I hope other superintendents will come in with their opinions.

"J. L. H." maintains that the best knitters do not make good fixers at all. I say that they do. It stands to reason that we can't take a man into the mill right out of the country, or the grocery store, send him upstairs to the knitting room and make a fixer out of him without any preparation. He wouldn't know "what it's all about."

The boy who starts out knitting in the knitting room has the best opportunity of anybody to learn to be a fixer. A man running some knitting machines doesn't have to work like a man in one of Henry Ford's highly efficient factories, where if he fails to put in the particular little bolt he's paid to while the car being assembled is coming down to him he throws the whole thing off schedule. Running knitting machines is a sort of intermittent job—a fellow doesn't have to run around like a chicken with its head cut off—and the boy has time to watch the machine and figure out how it operates. The greenest dumb-bell in the world, if he's interested in getting ahead, is certain to absorb something in this manner.

I was a fixer myself once, and many's the time I've seen a mere lad come up to an old fixer—one of these old fellows who had been at the game for years on end—who was struggling with a machine "to see what's the matter with the dad-blamed thing," and I've seen a young boy come up and show him the trouble right away.

This word "fixer," as it is applied in our knitting industry, is a much-abused one. There are a very few real fixers in comparison to the number who are operating under that title. I call a real fixer a man who goes at a machine to find out the little thing that might be causing the trouble. Most of these birds start looking for something big right away, something anybody could see, much less a fellow drawing the pay of fixer. And in the great majority of cases, it's one of those little things that he thinks is too insignificant to bother with, that's gumming up the whole works.

In line with this discussion, I will add that I have fifteen fixers in the knitting room, and two in the looper room, and everyone of them was a boy who formerly ran knitting machines—and they were *good* knitters, too.

Let's hear from somebody else.

N. C. S. (Tenn.)

We invite our readers to make use of this department for the discussion of any and all problems arising in connection with the knitting mill from the office to the packing and shipping departments. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. All questions will be answered as promtly as possible. The names and addresses of the contributors must be given, but will be held in confidence and a pen name substituted when printed. All accepted contributions other than questions will be paid for after publication. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so endorsed. This department is open to all.

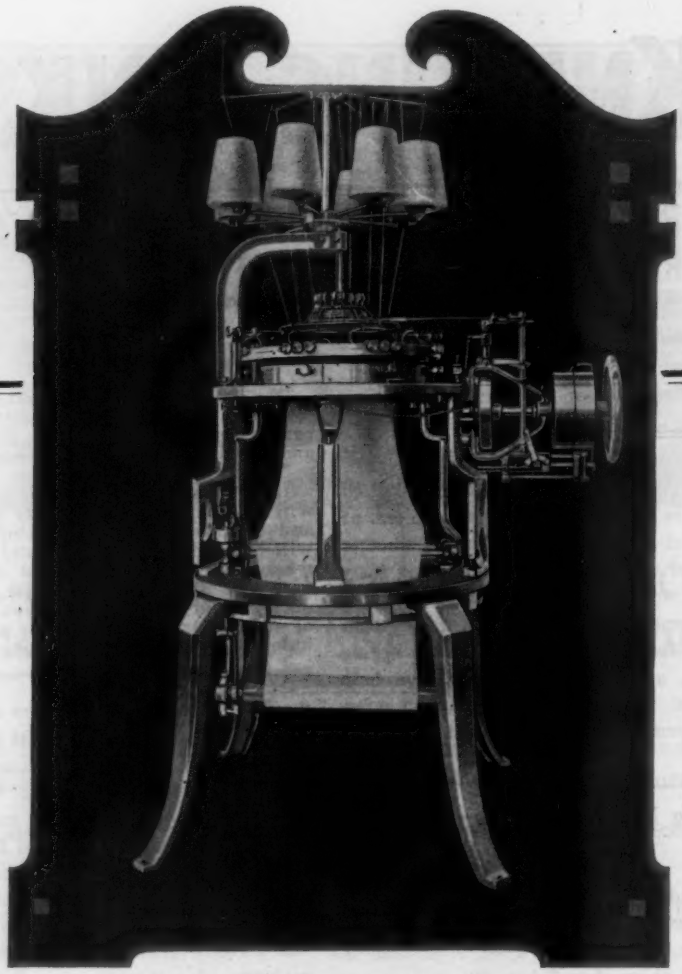
A Remedy for Corner Hole Cutting.

Editor Cotton:

In reply to the question of "F. G. H. (N. C.)" in the "Knitting Kinks" section of your August issue, I will say that we too have had considerable difficulty with the George D. Mayo machine cutting holes in a corner. My experience with this machine leads me to believe that this trouble is more serious with this particular machine than with any other machine on the market. The following remedy will assist about as much as anything, assuming that other adjustments are properly made:

Drill a hole in the cam ring bed about 3/8 inch and put in a brass plunger and spring, thus allowing the spring to create a friction on the floating cam ring. Then by making the proper adjustments with the sinker ring, there will be less trouble in the cutting of the gore.

If this information is not perfectly clear, I should be



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Perfection in knitted fabrics is assured when your product is made on the Wildman Spring Needle Body Machine.

Every Wildman Machine is known for its accuracy of mechanical construction in all details and the uniform high quality of materials used in its manufacture.

Nothing is left to guesswork.

From the original design to the final knitting test, each operation is under the control of experts in our own completely equipped plant.

Let us send you an illustrated instruction book giving full information about the Wildman Spring Needle Body Machines.

We have issued a very complete and informative book, "The Science of Knitting"—Price $3.00

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pleased to go further into the matter upon request from any of your readers. B. M. (N. H.)

Catching Defects on Ribbers.

Editor Cotton:

My superintendent friend had just been through our mill. "Well, J. D.," he said, "I must compliment you on your knitting room. Everything's clean, the machines are all hitting 'er up right along, everybody seems happy, and I understand your waste and seconds are 'way down. But there's one thing I noticed that doesn't seem to fit in with all your other efficient conditions."

"What's that?" I asked, and perked up my ears. "Why is it that you use such small baskets under your ribbers?" asked my friend. "Looks to me like if you made them larger so they would hold more goods, you could get along with less help, and it wouldn't be necessary to take up the work so often—"

"That's just the point," I interrupted. "I use those small baskets so they *will* have to take up the work frequently. That lets us catch bad work quicker, because it can be noticed sooner if we don't let much work run down into the baskets. If we allowed yards and yards to be knit, there might be a defect in the machine that would make bad work all the way down, but in this way we catch it almost as soon as it shows up."

My friend was unconvinced as to the value of my method. He went on to explain about how he has the work run for a long time, and then has it all taken to one place in the room where a girl does all the cutting. He explained how many more machines the girls on the ribbers can run, and all that—

Is my friend right about it, or am I doing the right thing? What do your readers think? Have they found that the reduction in seconds from bad work on the ribbers that is secured by a closer inspection offsets the additional labor cost because the operators can't run as many machines—or does their experience show that it is just the other way around? I should like to see the opinions of some men on this point. J. D. (Tenn.)

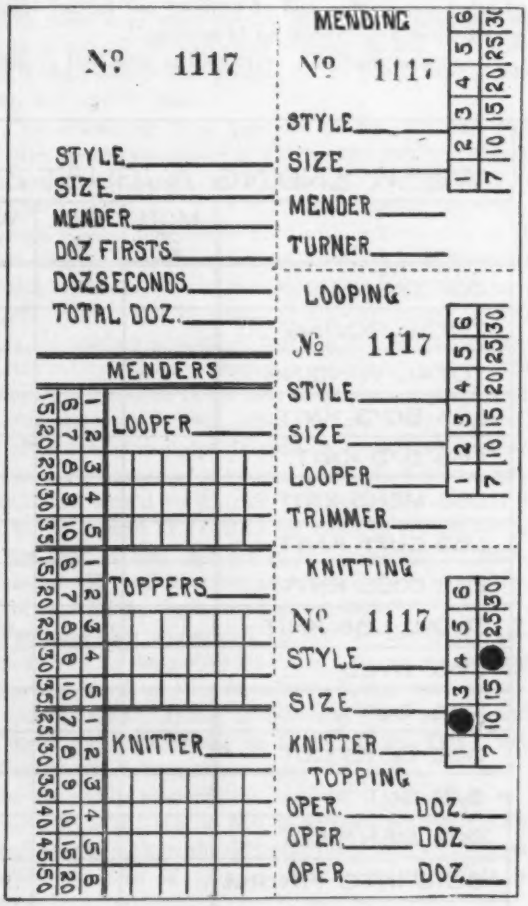
A Routing System With Some Special Features.

Editor Cotton:

As a contribution to "Knitting Kinks"—which, by the way, I think is a splendid idea—I am sending herewith one of the cards we use in routing the goods through the mill, which also serves as a part of our pay-roll system. Some mills use a punch-card system for paying the knitters, but we have carried this on and pay all our knitters, our loopers, and our menders, in this manner.

I will explain before describing the card that our system of operation is somewhat different from the ordinary practice. Most mills doing transfer work on hosiery have an operator who tends to so many machines, and also does the topping—and these, usually, are girls or women. Our system is different in that we use men to operate the machines, and then have girl toppers who put the tops on the transfers for the machines.

Now for the card: The card carries the lot number, and in the upper left hand corner, and on each of the small tags, the knitting room foreman fills in the style and size. On the tag in the lower right hand corner he places the number of the knitter to whom the work is given. At the end of the day, when the work is collected, the foreman using a street-car conductor's punch, punches, in the margin of the stub, the number of dozens knitted. (The card



in the illustration indicates 22 dozens knitted.) At the bottom of the card the foreman credits by number each topper working on this knitter's hose, with the number of dozens topped by each.

The work then goes on to the looping department, and this knitting stub is torn off and sent to the office, where it is used to make up the payroll and keep a check on production.

The stub for the looping department is handled in the same manner, and the one for the menders also. The left-hand portion of the ticket remains with the goods, so that it can be checked back at any time. Should we desire to do so, the left-hand part of the card may be used to indicate the number of defects made by each operator and the number of dozens punched the same as on the stubs.

We use a different color of card for each style of goods made.

L. M. M. (Ga.)

Send in your question or your solution to the other fellow's question; careful attention will be given to every case.

Keeping a Check on Production.

Editor Cotton:

I am writing this letter as one underwear mill manager to another. It concerns a phase of our work that is too often sadly neglected, and the hope of arousing the interest of other men in this, and of bringing out further ideas, is why I decided to "speak up in meeting."

I suppose practically everyone has some sort of method for checking up on the various operations in the mill, to see what they are doing and how much, but I daresay that a good many have adopted no definite, accurate system that gives them the desired information and at the same time relieves them of much red-tape and detail, leaving them free for consideration of the bigger elements which should concern the executive.

Accompanying this letter is a copy of a form on which is entered, *daily*, a record of the day's work in each major

WEEK ENDING AUGUST 23, 1924. HRS. RUN.	MON. %	TUE. %	WED. %	THUR. %	FRI. %	SAT. %	EST. PRO.	ACT. PRO.	WKLY. %
COTTON USED									
TOTAL ROVING									
TOTAL WINDING									
LBS. BOYS' KNIT									
LBS. S/D KNIT									
LBS. MEN'S KNIT									
LBS CUFF KNIT									
LBS COLL. KNIT									
TOTAL LBS. KNIT									
LBS. DYED									
LBS. CUT									
DOZ. BOYS' CUT									
S/D CUT									
DOZ MEN'S CUT									
BOYS' INTO FIN. RM.									
S/D INTO FIN. RM.									
MEN'S INTO FIN. RM.									
DOZ. BOYS' SEAMED									
S/D SEAMED									
DOZ. MEN'S SEAMED									
BOYS' BOXED									
S/D BOXED									
MEN'S BOXED									
BOXES MADE									
I H P PLANT A & B									
COAL BURNED — A									
COAL BURNED — B									
SEC. BOXED MEN'S ____ SEC 'BOXED S/D ____ SEC BOXED BOYS' ____									
% KNITTING MACHINES RUN AT NIGHT HRS. RUN									
% SPINNING FRAMES RUN AT NIGHT HRS. RUN									

operation in the mill. While it is more or less self-explanatory, the following remarks concerning the various items listed thereon may emphasize its importance and value to our plant.

In the column at the right-hand side, headed "Est. Pro.," we place, opposite each of the operations shown, the estimated production for that operation, putting it in pounds unless the item designates another unit of measure. Then, on Monday, for example, we enter the production for the day at each operation. This is done again on Tuesday and for the other days of the week. At the end of the week, we can total the actual production of each operation figured against the theoretical production, which will show us the weekly percentage of production for every operation in the mill.

You will note that I include practically everything involved, directly or indirectly, in the manufacture of the garment—the winding, knitting, dyeing, cutting, finishing, boxing, etc. We make our own boxes, and the number made each day is entered on the report. I also have the indicated horsepower at each of our two plants as well as the amount of coal burned at each. The number of seconds of each garment boxed each day is shown.

This report is filled out by a clerk, and is ready for me at the beginning of the day's work. I thus have on Tuesday morning a complete record of what each department did the previous day, Monday. I can see how many boys' garments went into the finishing room, and know how much work that foreman is supplied with, and so with each of the other operations. As a means for co-ordinating the work of the previous operations and of alloting the production, the report makes itself almost invaluable. I know how many boxes were made and how many were used, and thus how our stock stands. I know how much coal we used. I can determine the efficiency of the knitting department, or of any other operation, to direct me in making any detailed investigation as to the reason. The report has "paid its board" in acting as a co-ordinator between the departments, enabling me to ascertain just how much each foreman has to work with, as well as how much he did.

These records, kept for each week in the year, enable me to chart the curve of our production during any given period. The weekly figures are transferred to a week-by-week chart on my office wall, which shows us at a glance whether we are making progress or falling behind a previous record, both as to production and seconds.

I believe that a daily report of this kind—altered of course to fit the individual requirements of the particular mill—will prove its worth to any mill manager; and it certainly will introduce a factor of efficiency and accuracy into the work of our executives. I should be very glad to see in "Knitting Kinks" a free discussion by underwear mill men on this idea, and any other topic which concerns the problem of operating our plants more efficiently.

Contributor No. 311.

A bulletin just issued by the Bureau of Standards, Department of Commerce, Washington, presents the recommendations of the comittee for the simplification of bed blanket classification and the reduction in sizes. It also outlines the work of the committee which resulted in a reduction from 78 sizes to 12 sizes of cotton, wool and wool and cotton mixed bed blankets, corresponding to an elimination of 84.6 per cent.

Dyeing Three-Fiber Mixtures.

Editor Cotton:

In the knitting discussion section of the September issue of Cotton, "M. P. R." propounded some very interesting and pertinent questions relative to the hosiery mill. Among these were some queries regarding dyeing, and as this is a subject of particular interest to the mill manager, I shall discuss that portion of his letter, hoping that others will join in later.

I am answering these questions in my own way, and will take up first the matter of whether the paddle or rotary type machine is preferable for dyeing. For one, and in some instance for two, fiber stockings, I prefer the rotary machines because they can be filled with uniform weights of goods, and the proper amount of dyestuffs and chemicals can then be added without running very much risk of having off-shades. For all-cotton, or all-wool goods, or even where the mixture consists of real silk and mercerized cotton, the rotary machine occupies a prominent place in the dyehouse. Of course, in the first trials, even if small scale experimental work is done, off-shades are likely to result, but after the correct dye formula is established, *and no change in the quality of the yarns used is experienced,* uniform results should be the rule. If the management of a mill works changes of yarns in the knitting without advising the dyer of that fact before he commences his work, off-shades will result that are extremely difficult to remedy, and often must be disposed of as "seconds."

For three-fiber mixtures, I do not like the rotary machine as well as the paddle machines. My reason for this preference, based on long experience, is that one has better control over the dyeing operation with the paddle, and can watch the shade coming up to the match. This is not so conveniently done with the closed rotaries.

In the paddle machine, the freedom of circulation can be well regulated; this is also important, especially with three-fiber goods where the different fibers take on the dyes at different rates of speed, until the desired shade is reached.

Regarding artificial silk as a component of stockings, the statement of "M. P. R." as to its tendency to weaken is absolutely right. As a matter of fact, there is no good reason, outside of its luster, why artificial silk should be used for stockings, etc., articles that, from their very nature and use, require frequent washing. When stockings containing artificial silk are dyed in the paddle machine, especially where the movement of the goods in the bath is not too rapid, there is no injury. Artificial silk, when wet or damp, possesses about only twenty per cent of its strength as when dry. It is therefore seen that every care should be exercised in handling it. When the pockets of a rotary machine are pretty well filled with such stockings, the tumbling about is manifestly less than when they are loosely packed, but the circulation of the dye-liquor is not so free.

The subject of steam distribution is one of the most important points that could be raised in discussing dyeing machines and their use, but it is given too little attention. I am glad therefore that "M. P. R." has brought it up. In the first place, the heating pipes should be so placed as to give an even distribution of steam in the kettle. This means that the openings in the steam pipe are of the same size, and smooth on the *inside* of the pipe. The unequal

The "BANNER"

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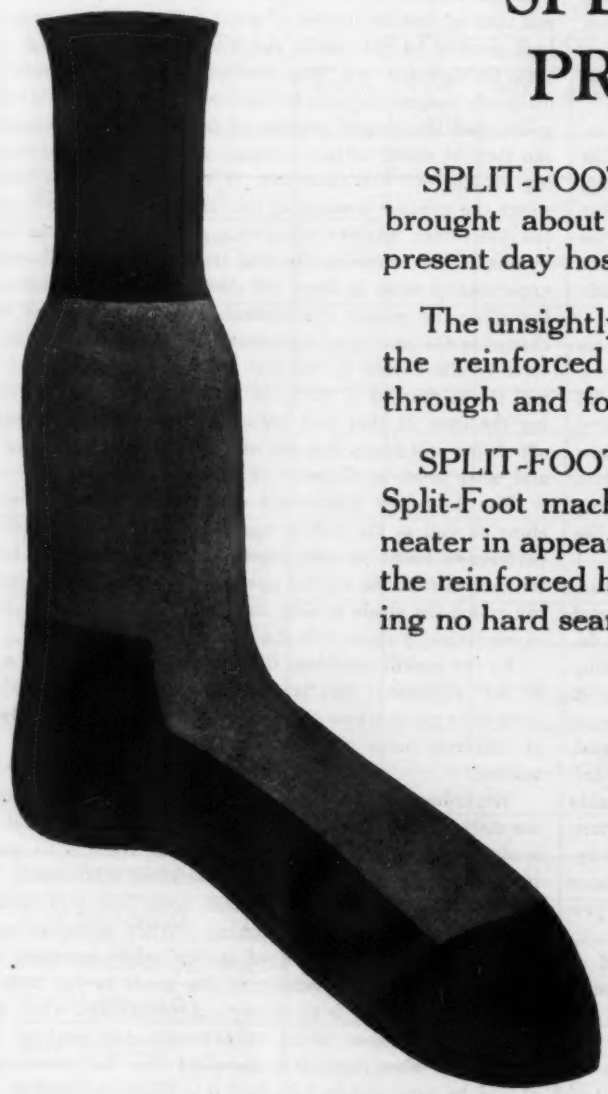

SPLIT-FOOT HOSIERY, the new creation, brought about by the main disadvantage in present day hosiery, namely:

The unsightly inside fringe of splicing ends in the reinforced portion which tends to slip through and form whiskers on the outside.

SPLIT-FOOT hosiery made on "BANNER" Split-Foot machines is smoother on the inside, neater in appearance and has added strength at the reinforced high splice and double sole, having no hard seams.

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discharge of steam into the dyebath is generally due to the holes becoming choked up on the *inside* by loose particles of thread, fibers, and other dirt that has been sucked back into the pipe after steam has been shut off. Such loose fibers, etc., cannot be blown out again on account of the rough burr on the inside edge of the hole. If all the openings are free and clear, steam will heat the bath uniformly. As a rule, the steam openings begin to clog at a point farthest from the main steam inlet pipe—the down pipe. Where a closed coil is used, it should have a sufficiently large heating surface, but such coils are not often employed.

In the foregoing discussion, let it be understood that I am not recommending or standing as the advocate of any particular type or kind of hosiery dyeing machine, but I am simply expressing my preferences, based on the kind of work to be done. If I were in a position to so build and own my own stocking dyehouse, I would install both paddle and rotary machines, using them as indicated in the preceding paragraphs.

Now as to "M. P. R.'s" question regarding the dyeing and choice of dyes for three-fiber work. Since most of these consist of real silk, artificial silk and cotton (including also mercerized cotton to complicate matters), and since each of these fibers requires a different selection of dye, it becomes necessary for the dyer who undertakes this class of work to be prepared to do a bit of experimenting with dyes on his own account, and to choose those that he finds best suited for his particular fiber mixture. All this takes time and a degree of patience not usually possessed, not to mention access to a range of dyes adapted to all conditions. For this reason, the aid of the dyestuff supply houses will prove of value, since they have the facilities and all the dyes and working data at haid to begin with.

The choice of dyes for three-fiber work resolves itself into neutral dyeing acid colors for the natural silk, and direct or substantive dyes for both the artificial silk and cotton. It must be remembered that the use of both mercerized and plain cotton in the goods complicates matching to shade, because the mercerized cotton dyes a heavier shade in the same bath than the plain cotton. Again, unless the mercerized cotton, if used, is not evenly mercerized, the dyer will have constant trouble owing to uneven shades. Many stocking dyers blame their dyes for this result, when the fault is actually with the unevenly mercerized yarn.

No exact rule can be given for dyeing three-fiber goods until the selection of dyes is made, except that dyeing must proceed regularly and at a constantly increasing temperature, not exceeding 180 degrees F., if viscose silk is to be dyed in the presence of other fibers, and lifting the stockings when the desired shade is matched.

X. Y. Z. (N. J.)

EDITOR COTTON:

Answering the questions of "M. P. R." in the September number. First, as to the type of dyestuffs which give the best results on cotton-silk-artificial silk hose, we find it best to make the base of three-fiber dyestuff mixtures out of those direct colors that dye all three fibers as nearly the same shade and depth as possible. By "base of a mixture" we mean the dyestuff used in the mixtures in the largest amounts. The best of these are slow to exhaust (level dyeing) and penetrate well. Choose dyestuffs nearest the shade to be matched. A green made from a mixture of a blue and a yellow will not work as satisfactorily as a green dyestuff shaded with a small addition of either blue or yellow, that is if all other conditions are the same. It is almost always necessary to bring the pure silk, of a three-fiber combination, up to the desired shade by the addition of neutral dyeing acid colors—acid colors that will dye silk with salt.

As to his question asking whether it is best to use uniform dyes, I do not understand this use of "uniform dyes." To dyestuff manufacturers this means batches of dyestuffs that conform to the same standard of strength and shade. This is a point in the technique of color production at the chemical plant. Obviously, it is best for all concerned to use "uniform dyes." Furthermore, the better manufacturers do "standardize" their dyestuffs so that consecutive shipments will be uniform.

Now as to the best method by which to dye three-fiber material, I offer the following: Enter material, that has previously been boiled out, in the dyebath at a low temperature. Various dyers enter material from absolutely cold up to 120 degrees F. and call this entering material at a low temperature. The dyestuff is dissolved separately and added to the machine. A good neutral soluble oil is used in the dyebath, one pound of oil for each 100 pounds of goods is usually enough to secure good penetration of heels and toes. The machine is brought slowly to a boil in from 25 to 40 minutes. We prefer to add the salt while the temperature is low. This exhausts most of the colors on the cotton. Most artificial silk has very great affinity for direct dyestuffs, and it will get its share as the temperature is raised. Boil for from five to fifteen minutes, depending on the depth of the shade. Boiling levels up the dyeing, and helps the colors penetrate the fiber. It is in the boiling phase that most of the silk dyes. This method is altered slightly where advisable because of special local conditions.

Now we come to his question of the relative merits of the rotary or paddle wheel machine. This debate on rotary and paddle wheel types is too involved to discuss briefly. It is like the school-boy assignment, "Write an essay on the United States." Perhaps it would be better simply to list the apparent advantages and disadvantages of each sort, in the following manner:

The advantages of the paddle wheel machine are: (1) They have a cheap first cost. (2) In this sort it is very easy to add extra dyestuffs (the long bath of the paddle type aids in this) so as to get even results. It is very easy to watch the progress of the dyeing in the open tubs. This feature is very necessary where unusual and novel mixed fibers are being dyed; heathers, for instance, are easily managed in this machine. (3) It is well to consider the simplicity of construction and operation here.

The disadvantages of the paddle wheel machine include the following (1) They are difficult to clean. It is impossible to run a light shade after a heavy one without extensive bleaching of the sides of the machine. (2) When it is necessary to place different sizes in bags, the loss of time and the expense of hand labor must be considered a disadvantage. Ladies' fine hose should be bagged to prevent tangling; when in bags some poling by hand is necessary. (3) The sides and paddles become rough with wear. This will of course damage fine goods. (4) There is considerable waste of heat by evaporation. It is easier to heat a closed kettle than an open one.

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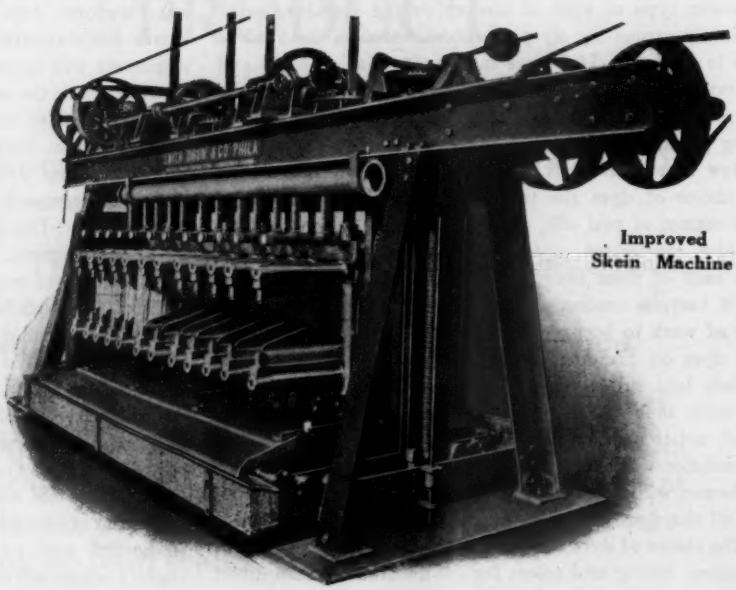

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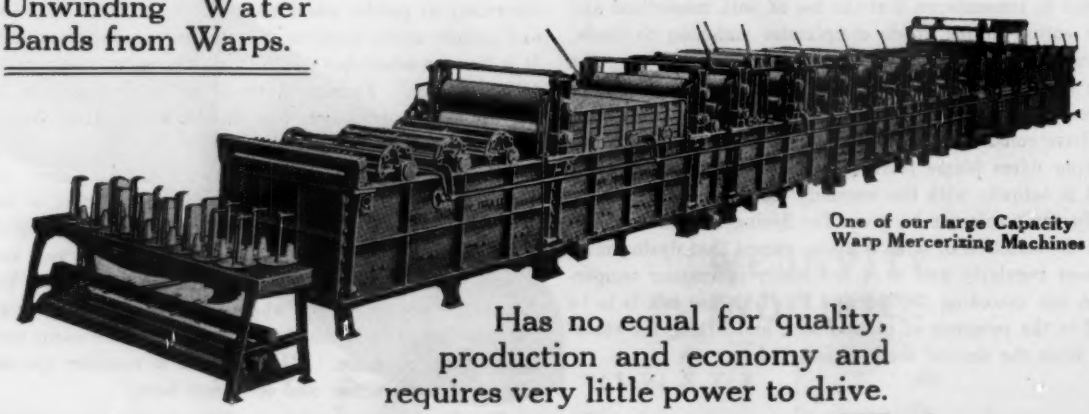

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Taking up the advantages of the rotary type machine, we find among them: (1) There is only a slight chemical action on the Monel metal machine—this makes for long life. The machines themselves do not absorb color; hence, they are easily cleaned. (2) Rotary types are especially suitable for ladies' fine silk or mixed silk hose. The goods have a better chance to dye evenly than when they are placed in a paddle wheel machine in bags. (3) There is comparatively little heat loss in a closed machine.

The rotary type also has its disadvantages, among which may be brought out that: (1) Rotarys have a high installation cost. (2) Extra portions of dyestuffs cannot be added to this machine as easily as in the open types. That is, the same dyestuff, added under the same conditions, is more likely to dye unevenly in the rotary than in the paddle wheel type. Here the concentrated dyebath is a hindrance. (3) In this kind of equipment, there is a slight tendency to heat unevenly. It is not difficult to correct this. I have seen 200-pound machines that have a separate 1¼-inch pipe entering each end of the cylindrical drum. These are not connected in the center of the machine. Each pipe has its own operating value. A pipe has two to four openings in the machine to heat its half of the liquid. (4) It is difficult to watch the progress of the dyeings, because of its closed construction.

New types of paddle machines made of non-corrosive metal alloys eliminate many troubles experienced with the old wooden tubs. Some of these new patterns are of wood, but are lined with metallic sheets

As we look over the entire field and consider the different classes of goods and dyers there seems to be little difference in the two types so far as production is concerned; that is to say, production of finished hose depends quite as much on the efficiency of the dyer and his helpers, on the steam and water supply, and such variables, as it does on the kind of machine used. We believe the average rotary machine in use is larger than the average paddle type; this may account for the common opinion that a rotary machine will produce more finished goods.

T. R. E. (N. C.)

EDITOR COTTON:

In response to "M. P. R. (Tenn.)," I should say that where a three-fiber stocking of artificial silk, cotton and pure thread silk is made to be dyed, a union dye should be used if one shade uniform on the stocking is desired—that is, a union dye should be used that will dye all three fibers alike. Should a two-tone effect be desired, a combination dye can be used that will dye the artificial silk and cotton one color and the pure thread silk another; or a small amount of acetic acid can be used in the dyebath, giving the cotton and artificial silk one color and leaving the pure thread silk a white or silver color in combination.

In getting two-tone effects much depends on how the yarn combinations are entered into the hose. It can be run in at random, or the yarns can be purchased twisted, in combinations to suit the purchaser.

Regarding the temperature of the dye-bath, this also depends entirely on the combinations, however, the combinations of artificial silk, pure thread silk and cotton can be dyed by entering the bath at 90 degrees F. and bringing it to a boil in 45 minutes, then adding the salt, running 15 minutes more, and sampling for shade.

It is advisable, owing to the many different dyeing combinations, to get the formulas for each color or combination from the dyestuff manufacturers from whom the dyes are purchased.

Referring to the rotary as against the paddle type machine for dyeing, this is a matter of personal opinion and local conditions of the mill, as to which is most economical to use, but the rotary machine is so far superior in every respect, that no room for argument is left, except for even dyeing on light shades.

For instance, the rotary machine contains pockets, or compartments, three, four, six or eight according to the capacity of the machine. Each compartment contains a separate size, so that a complete range of sizes can be dyed in the same length of time that one size can be dyed in a paddle machine. This allows the goods to go through the boarding and finishing departments much more rapidly, and with an assortment of sizes ready for shipping.

In unloading the rotary machine, the pockets can be opened and the goods taken out with very little effort or labor, while in the paddle machine (unless there is an automatic basket device for the machine) the goods must be taken out with a pole, by hand, requiring considerable time.

The water content in a rotary machine is much less than in the paddle machine, which does not allow the dye bath to be as concentrated in a paddle type machine.

There is a natural churning motion in a rotary machine, which does not cause the nap of the goods to come up, while in a paddle machine the paddle must come in direct contact with the goods, and thus has a tendency to leave them more or less picked up.

It should be no trouble for "M. P. R." to add additional dyestuffs to his rotary machine, as most rotary machines are now equipped with a copper funnel shaped container that is connected to the steam line, and the steam can be turned on at the same time the dyestuff is put in this container, which gives an even distribution to the added dye. These containers can be made and placed on a rotary machine if not already applied.

Any rotary machine should heat evenly, if there is the proper steam coil in the bottom of the machine. For instance the line can enter one side of the machine, making a two-coil turn, with an exhaust coming out of the other side of the machine, and this should assure even heat at all times. Many machines that contain a perforated steam pipe give uneven heat in the dyebath on account of the holes becoming stopped up at one end or the other; therefore I prefer a solid pipe with an outlet at the opposite side from the inlet, with a small valve to allow for the exhaust of the condensation.

B. D. (TENN.)

EDITOR COTTON:

Replying to "M. P. R.'s" question as to the sort of dye it is best to use in union-dyeing—silk and artificial silk in several combinations—my opinion, which is also the opinion of a number of dyestuff chemists, is that it is necessary to use both silk dyes and cotton dyes, but it is impossible to give a list of these colors because they include practically everything in their line. For example, the dyeing of light tans would take a combination of certain dyestuffs where the dyeing of cordovans and other shades, the dyestuffs would be entirely different and to go into the matter would be like writing a book. The best plan is to

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give the dyestuff man samples of the stockings and the colors to be matched and let the dyestuff people work out the formula for each shade.

Regarding the temperature, on light shades, enter the goods in the dye-bath at about 180 degrees and raise to a boil. In adding the colors, shut off the steam and let the dye-bath drop below the boiling point before the additional colors are added. On heavy shades, enter the goods when the temperature is about 135 degrees and then raise to a boil. In all cases where a combination of artificial silk and cotton or silk are dyed, it has been found necessary to add a good soluble oil, which tends to even up the shades. Some people add six to eight per cent.

As to the question of whether a paddle or rotary machine is better, this matter has interested me for the past two years, and I have talked it over with hundreds of dyers and have not as yet reached a positive conclusion. It is very much like discussing with all gun fans the question as to whether they should use a 12 gauge or a 16 gauge gun or a light load or a heavy load or a full choke in preference to modified. I have talked to dyers who would not have a paddle machine under any circumstances, and to other dyers who would not use a rotary machine. This opinion of mine is unbiased, but if you ask any dyer you will get a positive opinion for or against either machine, as they all seem to be prejudiced one way or the other. From my experience and observation, I have found that the goods must be handled differently with either machine, and when a dyer who has been using a paddle machine tries out the rotary machine, if he handles it the same as he did the paddle machine, the results are poor. The same applies to the man who has used the rotary machine and tries out the paddle machine. In other words, either machine is good if handled in the proper manner, but the average dyer would be sure to make a case against either one of them.

J. A. (Pa.)

A Daily Production Report.

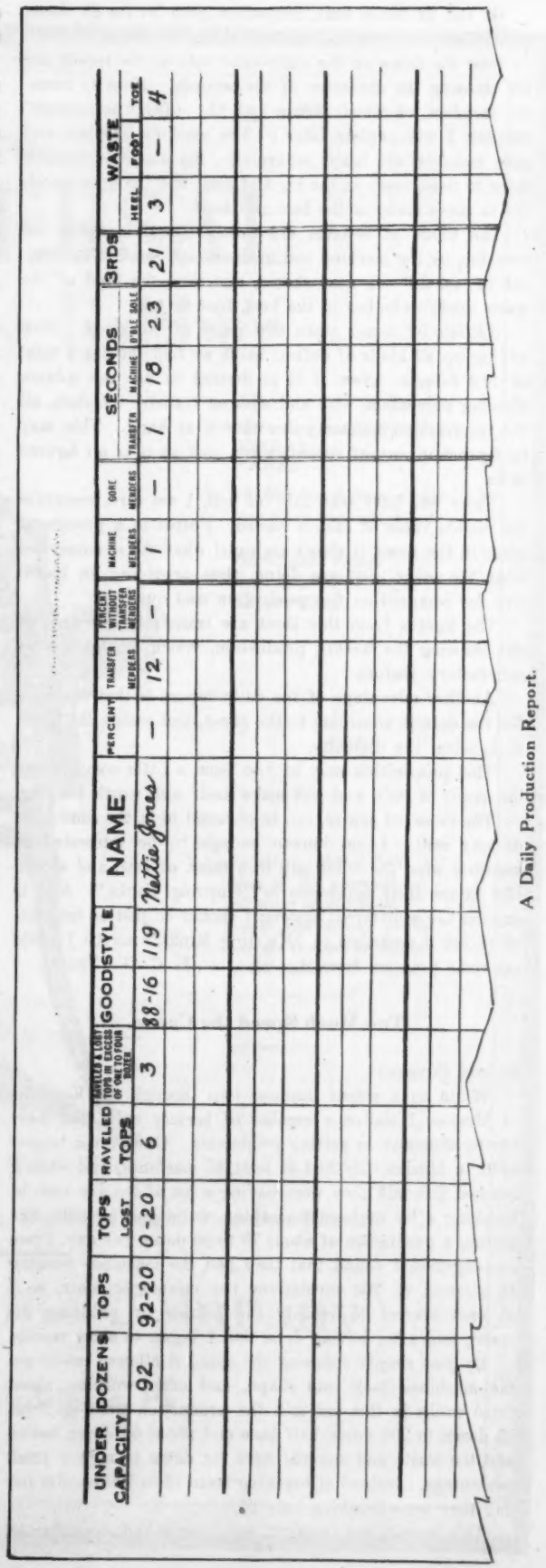
Editor Cotton:

I am sending you herewith a form that has proven of material assistance in our half-hose mill; but it also can be adapted to suit the conditions in practically any type of hosiery mill. For that reason I am submitting it so the readers of "Knitting Kinks" may see it and possibly get some suggestions from it for their own use.

The form in its actual size is 14 inches wide, and its length is made in accordance with the number of operators. Ours is about 30 inches long, which gives space for the records of something over 100 operators if necessary.

This form is posted in the knitting room, and on it a record for the days' work for each operator is kept, according to the several items shown on the sheet. To illustrate the use of the record, let us take the report of Nettie Jones, which is shown on the copy herewith.

In the second column from the left, it is noted that Nettie knit 92 dozen. The next column shows she was furnished with 92 dozen and 20 tops and she thus lost 20 tops, which is recorded in the next column. On this day Nettie had six raveled tops, which is noted in the column thus headed. The girls are allowed one raveled or lost top to every four dozen. All over this is charged against them, thus Nettie shows an excess of 3 in the next column.



A Daily Production Report.

Of the 92 dozen knit, inspection gave Nettie 88 dozen and 16 stockings "good," which is duly recorded.

Now the items on the right-hand side of the report are for showing the character of the seconds. First is transfer menders, of which Nettie had 13. (The "percentage" columns I will explain later.) The machine menders and gore menders are listed separately; the machine menders refer to those made in the leg and foot, and the gore menders to those made in the heel and toe.

The kinds of seconds are shown—those made at the transfer, by the machine and in the double sole. The number of 'thirds" are next shown, and then the kind of the waste made—whether in the heel, foot or toe.

Nettie's 92 dozen make 960 pairs of stockings. Now adding up all kinds of defects made we find she has a total of 112 defects. Now if it is desired to use the column showing percentage with and without transfer menders, all the information necessary for this is at hand. This may be figured in any of several ways, just so it is all figured alike.

Those who have read this far will, I am sure, recognize the double value of such a record. Posted in a prominent place in the room, it shows each girl what *she is* doing and what the *other girls* are doing, thus providing an incentive for competition for production *and* quality.

The figures from this sheet are transferred to another one showing the weekly production, which is also a very satisfactory feature.

Another advantage of the daily report is that it classifies the defects according to the cause, and assists the fixers in locating the difficulty.

This proposition may at first seem a little complicated, but really it isn't, and will make itself well worth keeping.

The items, of course, can be changed to fit the conditions of any mill. I am human enough to be interested in knowing what the other mill men think of this, and should like to see their comments in "Knitting Kinks." And if anyone has a different system, I should be just as interested to see it described in "Knitting Kinks," maybe I could get some pointers from it. L. C. G. (Tenn.)

Too Much Speed the Cause.

Editor Cotton:

While on a recent business trip through the Republic of Mexico, I visited a number of hosiery mills that were having difficulty in getting production. One of the largest mills in Mexico City had at least 45 machines, and when I reached this mill they were having a lot of trouble such as breaking a lot of needles, making waste and seconds, and getting a production of about 75 to 80 dozen per day. Upon investigation I found that they had the machines running at a speed of 300 revolutions per minute or more, so I at once started to remedy the trouble by reducing the speed, and after having done this I began to show results.

By just simply reducing the speed it allowed me to get the machines back into shape, and after working about three weeks in this one mill the production went up from 75 dozen to 200 dozen half hose and about 50 dozen ladies, and the waste and seconds were cut down to a very small percentage. Instead of breaking from 75 to 100 needles per day they were breaking only 25.

This is only one instance, and I have had a number of similar experiences. I have not as yet found that running hosiery machines at a high rate of speed is beneficial. This is a simple remedy, but it proved to be of great advantage.

Trouble Man (Pa.)

Some Hosiery Mill Kinks.

Editor Cotton:

If your "Knitting Kinks" section, through presenting different ideas from different men, can induce more of us knitting mill superintendents to really *think* about our jobs and try to improve our systems and methods, it will perform a much-needed service to the knitting industry as a whole.

I'm writing this letter to tell you about something we do that is of help to us. Lots of other men may know about it; maybe some of them don't.

Running pure silk ladies' work, I put a tuck stitch inside the welt. The number of stitches tells the number of the machine on which the hose is made. For example, if it is machine No. 5, there are five straight tuck stitches; if it is machine No. 25, we make two tuck stitches, then skip some and make five in a row, etc. Each morning, I take one hose off of each machine, take it down-stairs and degum it, and then tint it. Thus I am able to readily detect any defects caused by bad needles, rough needles or from any other cause. I do this the first thing in the morning so I can have the proof back upstairs inside of two hours and get the difficulty corrected before it makes any more bad work.

On our other work, we have numbered pins that are fastened to the work to indicate the machine, and every so often this work is taken downstairs and tested for size, etc.

To me, one of the greatest needs of the hosiery industry today, so far as the mill itself is concerned, is a proper laboratory. We have one that I look after myself, and it has saved its expense many times. We never buy any mixed dyes, and thus don't take any chances on this point. The knitting mill superintendent knows what I am talking about. It doesn't require a skilled chemist to operate a laboratory for a knitting mill, and it doesn't take much equipment, but it surely will pay for itself many times over. I believe the knitting mills of the country would be much better off if they would give this matter consideration.

I wonder what other knitting mills do with the cases in which their yarn is received? We have a carpenter, an old man, who takes these, and with very little alteration, makes them over into cases in which to ship our own product. It doesn't cost much. This one man makes all the cases we need and we don't have to go out and buy lumber for them, either.

I suppose everybody has their gray-goods bins lined with something. I line mine with oilcloth, and have found also that duck, secured from a cotton mill here in town, answers very nicely. This saves many losses by preventing the stockings from becoming snagged on small splinters while being pulled out of the bins. y

And of course every one has a rack where odd pairs of stockings are put in boxes, and then when the girls in the packing room come out two or four pair extra, they fill up these boxes to make up even quarter or half-dozen lots.

M. R. (Ga.)

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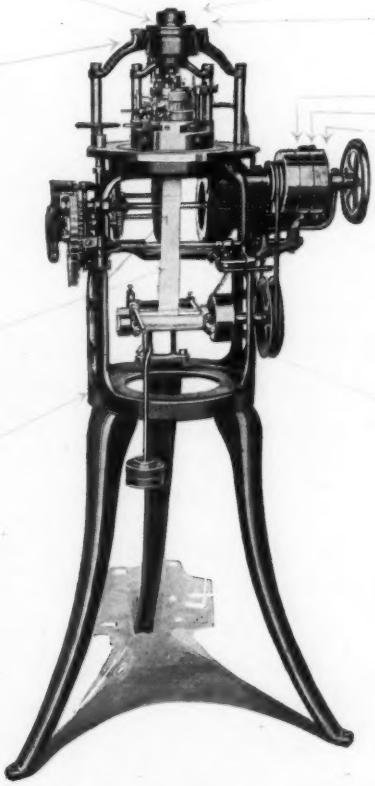

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Hosiery Dyeing and Its Problems*

BY RICHARD C. SPURGEON.

In discussing hosiery dyeing and its problems we must always hold in view the fact that these methods and problems are very numerous; that they differ in almost every individual case because of the varied training each dyer has had; and we must consider the different adverse conditions in every dyehouse. One dyer must combat hard water; another has mechanical problems; another has poor lighting conditions to deal with, and so forth. Of course, we cannot solve all problems encountered by all dyers in the few minutes allotted to this paper; nor can we give all the methods of dyeing the several kinds of hosiery, for they are practically unlimited.

In the days of the near and far past each individual dyer had his formulas and his secrets, which were kept under lock and key or in his hip pocket, and the man who received these magic recipes or formulas as his heritage was fortunate indeed. This sacred and unapproachable book usually descended through their immediate families generation after generation. But today all the mysteries of the past in dyeing are disclosed to the present and the future, and so tonight we are able to discuss freely and openly "Hosiery Dyeing and Its Problems."

The dyeing of each kind of hosiery is a study in itself—especially the three fiber hosiery, of which we will speak later. The method we will give as a standard or basic method for each class is the result of having tried all the ways that are known generally and some that are original. These methods that will be given specifically are the most efficient of which we know. They are being used by the speaker with excellent results in a job dyehouse where speed, accuracy and consistency are required.

They are the conditions every dyer would like to enjoy day in and day out—that result in swift, accurate and consistent dyeing. Unfortunately, we cannot have everything rosy all the time; so the best one can do is to select, after much experimenting, the methods best suited to one's requirements and machinery.

I wish to say that for dyeing any or all kinds of hosiery the paddle machines are far superior to any of their kin. They produce absolutely level dyeing; the goods may be shaded with unusual rapidity and loaded and unloaded quickly and easily.

In discussing problems we will have to confine ourselves to those met with in every lot of hosiery dyed. We will concern ourselves chiefly with the problems of obtaining even penetration, level dyeing, speedy and consistent work. The matching of shades we will not consider, for that rests entirely with the dyer, the lighting conditions, the fabric being matched and the dyers' knowledge of the properties of dyestuffs.

The chief troubles encountered in dyeing full-fashioned and seamless all-silk or silk and mercerized cotton hosiery are lack of penetration in the seams, heels and toes, that become turned-in and folded, and unevenly distributed dye. These troubles are easily overcome if the dyer will change his usual method of boiling off first to the degumming or "boiling off and dyeing at the same time" method. This is the cure-all method of dyeing silk hosiery, and I am convinced that the time has come when every hosiery dyer should dye and degum his goods at the same time. The same dyes are used in this method as in others—direct and neutral working acid colors. Usually the silk requires from two to three times as much color as in usual methods, but the cotton is filled up more easily and the silk is more lustrous because of the absorption of oil and the prevention of friction brought about by the presence of the soap or the degumming oil in the bath.

The method is a very simple one. The only difficulty it entails is that sometimes extremely hard water will precipitate the oil used. The question arises: Which is best fitted for the work—boil-off oil or soap? The oil, which is usually a mixture of sulphonated castor oil and silicate of soda, accomplishes everything soap does and, besides, leaves the cloth with a high luster and soft feel, and does not break up in hard water, providing a high-grade oil is used. I prefer, for these reasons, boil-off oil.

The procedure for this method is as follows: The goods are wetted out well in the boiling water for about ten minutes, then the temperature of the bath is lowered to 120 degrees F. and the necessary amounts of boil-off oil and the well-dissolved and strained dyestuffs are added to the bath. The goods are worked for five minutes at this temperature, and then the bath is heated to the boil. At this point it is well to sample the goods, for one can tell if his shade is developing as it should or not. The silk usually appears too full; but as the gum is boiled out and the color boiled in, the shade gradually reaches a point of equilibrium. The cotton, if present, may be shaded from this point, but if it is near the shade the lot should be allowed to run ten minutes at the boil before making additions. The time to begin shading the silk is a matter of nearness to shade at a given time and of experience with this method. Usually, after twenty to twenty-five minutes' boil, the goods may be shaded. After about thirty to thirty-five minutes' boil, the seams are thoroughly penetrated and the additions may be made every ten minutes with the certainty of level results.

You have noticed, no doubt, that we have omitted the usual additions of salt; we have made this omission purposely. This assistant should be left out entirely on light and medium shades when best results are desired, and only added when it is absolutely necessary, as it usually is on cordovans, gun-metal, navys, autumn browns, etc., and then should not be added until the seams are penetrated.

The adherents to this method are fast becoming more and more numerous, and when once tried an enthusiastic convert is added to the list.

When the dyer's formulas are once established it usually requires from one to two hours to dispose of a lot, thus doubling, if not tripling, production.

The dyeing of colors on full-fashioned, mock-fashioned or seamless hosiery is carried out by this method, and the points in favor of the method are: Speedy penetration of all seams, heels and toes; absolutely level dyeing and better conditioned silk—that is, better luster and feel, minimum redyeing, and increased production.

* A paper read before the Philadelphia Section of the American Association of Textile Chemists and Colorists.

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H. BRINTON COMPANY
Philadelphia Pennsylvania

Next we will consider the dyeing of seamless and full-fashioned three-fiber hosiery, usually consisting of a mixture of art silk and tram silk in the body of the stocking and mercerized cotton tops, heels and toes. This hose may also be dyed in the boil-off bath, but more consistent and more solid results are obtained by degumming the silk first and then dyeing; and we recommend the degumming oil for this purpose, for the same reasons given before.

The relative amounts of artificial silk and tram silk vary according to the manufacturers' desire. When the hosiery to be processed contains mostly artificial silk, the best results in dyeing are obtained by using colors that are strictly union colors. That is, they must have the same affinity for each of the fibers in the presence of each other in the dye bath. Of course, the dyestuffs selected will vary as the shades vary, and lists of these colors may be obtained from any dyestuff manufacturer.

Before we proceed any further I wish to say that the perfect dyeing of three-fiber hosiery in solid or mixed effects requires, on the part of the dyer, first of all, a very extensive and intensive knowledge of the working properties of dyestuffs under all conditions, and those who desire to enter hosiery dyeing as a profession would do well to equip themselves with this knowledge.

After degumming the hosiery it is washed well and the bath is prepared at about 120 degrees F. The necessary amounts of color and some sulphonated castor oil, about ¼ to ½ per cent, are added. The goods are entered and the temperature raised to the boil, where it is well to sample for reasons stated before. After boiling for about ten to twenty minutes the goods are sampled and, usually in light shades, the art silk appears empty. At this point common salt is added to force the color on the artificial silk and produce a more solid effect. Common salt is a very important factor in this dyeing, for it is of prime importance in producing solidity between the cotton top and the body of the stocking. But when shades such as log-cabin, field mouse, gun-metal, etc., are being used, it is most beneficial to use only a small amount of Glauber salt as an assistant.

When we approach shades such as cordovan and navy blue the method changes entirely. The best results are produced in a concentrated liquor of a ratio of fifteen to one. The bath should contain about 10 per cent of sulphonated castor oil, and here it will be necessary to shade the tram silk with neutral working acid colors. The goods should be dyed at the boil to give perfect penetration.

If the tram silk should absorb too much dye and the stocking look mottled, or freckled, by adding some soap or boil-off oil to the dye bath the artificial silk may be added to the desired effect below the boil.

Often the manufacturer will substitute Viscose artificial silk with Tubize artificial silk. This silk is a little lower priced than the Viscose and runs better when a number below 150 Denier is wanted. The hosiery containing this silk is indeed a hard proposition to dye satisfactorily, especially when the goods are plaited. But by dyeing in the degumming bath and salting the direct color in the bath on the artificial silk, very satisfactory results are obtained.

The dyeing of heather effects on three-fiber hosiery may be done in three ways: The artificial silk and mercerized cotton are dyed in the soap bath, usually the boil-off bath, with colors that leave the silk white; then washed well and cross-dyed at a lower temperature—usually 120 degrees to 140 degrees F.—with neutral working acid colors. Or they may be dyed in one operation; that is, the three fibers are dyed their respective shades at the same time. Another intresting method that is little known is the dyeing of silk-white effects with sulphur colors in light shades. This method is as follows: The goods are wetted out well at the boil. When the temperature of the bath is made at 170 degrees F., the necessary amounts of sulphur colors, sodium sulphide, soda ash and common salt are added and the lot run for about half an hour at 170 degrees F. The hosiery is well washed. After the completion of dyeing the silk is degummed. The gum is left in the silk before dyeing because of its protective properties against the alkaline bath.

Hosiery consisting of artificial silk and wool, or cotton and wool, is dyed with union-dyeing direct colors and neutral-dyeing acid colors. Hard water has a very direct influence in solid effects on this class of hosiery, inasmuch as its presence causes the direct colors to boil very readily on the wool, sometimes producing undesirable heather effects. This is easily corrected in the bath before the goods are entered for dyeing. The chief trouble encountred in dyeing these goods is shrinkage of the stockings after they have been worked for a longer period than usual. This is usually caused by the use of too strong an alkali to remove the grease in the wool or the throwing oil present. The best material that can be used for scouring woolen hosiery is a mild scouring oil made for that purpose.

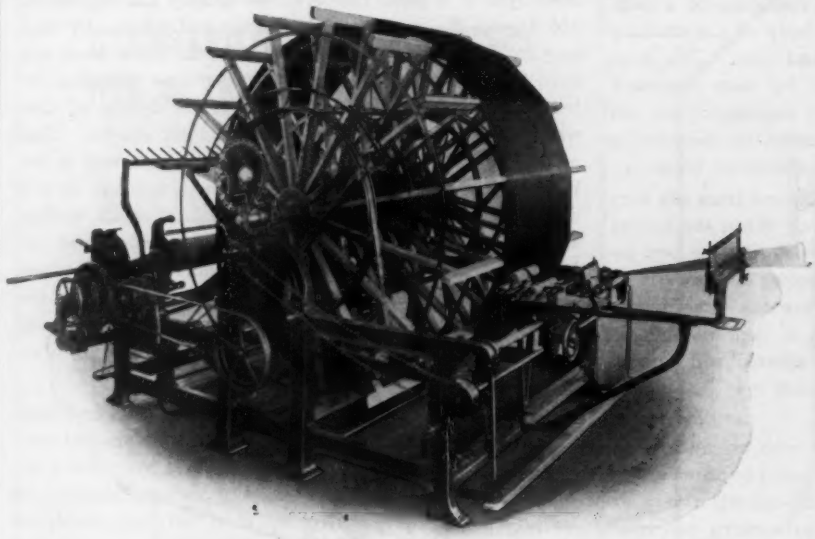
Hosiery consisting of tram silk and wool is another class of hose that requires careful study. The dyer is required to produce many varied heather and solid effects on it.

Sometimes the silk contained in the hose is boiled off before being thrown with the wool, but when it is in the gum it should be degummed. This process is usually done at 170 degrees F. with boil-off oil, previous to dyeing.

The dyestuffs used to dye silk and wool hosiery are: Direct colors, acid colors, and neutral working acid colors. Solid effects are produced easiest and best with direct colors, while heather effects and silk-white effects are best produced with the latter.

The method for dyeing heather effects is as follows: The required amount of dyestuff and about 5 to 20 per cent of acetic acid, depending on the depth of shade, are added to the bath and the temperature made 120 degrees F. The well-scoured material is entered at this temperature and raised to the boil, where the wool is shaded to the desired effect. Then the temperature is lowered to 140 degrees to 160 degrees F. and the silk is shaded at this temperature with neutral-working acid colors. Temperature control is a very important factor in controlling these effects, and should be watched carefully.

An interesting booklet telling of the romance of leather and its importance to mankind is being distributed by the American Sole and Belting Leather Tanners, 17 Battery Place, New York City. Copies may doubtless be secured upon request to this organization, which is a group of independent sole and belting leather tanners formed for the purpose of public information.



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Among the Knitting Mills

Attix Hosiery Mills, Knoxville, Tenn., will erect a two-story brick mill building which will enable the mill to triple its output. The new building will be 32 x 90 feet, with a dyehouse 18 x 33 feet. E. D. Attix is the owner.

The Enfield Hosiery Mills, Enfield, N. C., recently destroyed by fire, will be rebuilt.

Real Knitting Mills, Hickory, N. C., have been incorporated by C. S. Grove, J. H. Hart, and others. The capital is $40,000.

A large plant for dyeing, bleaching and finishing underwear and other cotton goods will be erected at Winston-Salem by the Hanes Finishing Company, recently organized. R. M. Hanes, Ralph Hanes and H. A. Jolitz are interested.

The Eclipse Knitting Mills, 215 Springfield Avenue, Newark, N. J., will soon take bids for the construction of a new plant on site selected on South Eleventh Street. It will be three-story, 82 x 93 feet, estimated to cost approximately $55,000. It is proposed to remove the present mill to the new location, with the installation of considerable new equipment. Edward V. Warren, Essex Building, Newark, is architect in charge.

The Sunset Hosiery Mills Co., Los Angeles, Cal., will soon break ground for the construction of a new plant on property purchased in the Beverly Hills district, to be one-story, 53 x 150 feet, estimated to cost about $45,000, including equipment. The Moran Co., Kerckhoff Building, Los Angeles, is architect and contractor for the work.

The Duvael Knitwear Mills, Inc., New York, N. Y., recently incorporated with a capital of $150,000, is planning for the operation of a local mill for the manufacture of a line of knit goods. The company is headed by C. B. Levine and M. A. Roth. It is represented by Edelman & Levine, 1650 Broadway, New York.

The Empress Knitting Mills, New York, N. Y., has plans under way for the establishment of a local knitting mill. The company will operate with a capital of $10,000. M. E. Levy and A. Zauderer head the organization; it is represented by Kaminsky & Parnes, 291 Broadway, New York.

The Louden Knitting Corporation, New York, N. Y., has filed notice of increase in capital to $40,000, and plans for expansion in its local mills.

The Ascot Knitting Mills, Inc., New York, recently organized with nominal capital of $5,000, plans for the establishment of a local works, for the manufacture of knit goods products. The company is headed by N. S. Cohen and H. Levis. H. H. Straus, 1225 Broadway, New York, is company representative.

The Masterknit Mills, West New York, N. J., have been organized by Victor Berck and Carl Weiss, to operate at 90 West Twentieth Street.

The Jackson Knitted Products, Inc., (Bronx) New York, recently organized with capital of $20,000, by H. Jackson, C. M. Rosenthal and F. Nathan, has plans for the establishment of a local works. The company is represented by Goldsmith & Rosenthal, 1476 Broadway, New York.

The Malvern Knitting Mills, Malvern, near Coatesville, Pa., manufacturer of cotton knit goods, infants' wear, etc., is considering plans for the rebuilding of the portion of its works, recently destroyed by fire, with loss of about $40,000, including equipment. The company is operated by William Richardson & Son.

The Henry Knitting Mills, Inc., Brooklyn, N. Y., recently incorporated with nominal capital of $5,000, plans for the operation of a local knitting mill. The company is headed by N. H. Levy and F. Musso; it is represented by L. J. Gribetz, 233 Broadway, New York.

The Perfect Knitting Mills, Hartford, Conn., recently organized, will operate a local plant. The company is headed by Jacob Weinstein, 356 Asylum Street, Hartford.

The National Crystal Knitting Co., Slatington, Pa., recently organized, has succeeded to the former local plant of the Crystal Knitting Co., and will commence operations at an early date. A number of extensions and improvements will be carried out, and full working force employed for maximum production.

Van Ultra, Inc., New York, recently organized, has plans under way for the establishment of a local knitting mill. The company is headed by H. Goodwin and C. Kaufman. It is represented by M. Sheinhart, 305 Broadway, New York.

McDonald & Heathcote, Inc., New York, N. Y., has been organized with capital of 200 shares of stock, no par value, to operate a local plant for the manufacture of a line of knit goods, for which arrangements will soon be perfected. The company is headed by R., and M. C. McDonald, and F. L. Heathcote; it is represented by Goldberg & Newhouse, 350 Broadway, New York.

The Olympic Knitting Mills, Inc., New York, N. Y., recently organized, has leased a floor in the building at 21 West Thirtieth Street, for its proposed local plant, for the manufacture of a line of knit goods, and will install equipment for immediate operations. The new company is headed by H. Weiss and A. Plancher, and is represented by C. Hiller, 276 Fifth Avenue, New York.

The Four Square Underwear Co., Olney, Ill., has been organized under state laws, to operate a local knitting mill, and will proceed with operations at an early date. The company is headed by George D. Dyer, and J. A. Clevenger, both of Olney.

The Union Knitwear Service, Inc., New York, has been chartered with a capital of $60,000, to operate a local mill, for which arrangements will be consummated at an early date. The company is headed by W. I. Weiss, and L. M. Kommel. It is represented by I. H. Namm, 1475 Broadway, New York.

The Saxony Knitting Co., Seattle, Wash., has perfected arrangements for the construction of a new mill on Fairview Avenue, to be occupied under lease. It will be one-story, 122 x 185 feet, estimated to cost approximately $50,000. A list of machinery to be installed will soon be arranged. V. W. Voorhees, Eitel Building, Seattle, is architect in charge.

Franklin Process Company, Providence, R. I., has developed a raw stock dyeing machine for coloring raw rool or for stripping or coloring shoddy or rags. One feature pointed out is that it effects a saving in labor, it being illustrated that one man can dye 5,000 pounds per day. An economy in steam consumption is also claimed.

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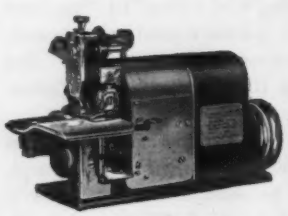

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Dyeing Knitted Fabrics in the Roll

Depending upon the use to which the fabric is put, the shades dyed may be either dark or light. Light shades, such as blues, pinks or tans, are dyed upon knitted fabrics comprised in whole or in part of cotton, and find their ultimate use as underwear.

The heavy shades, explains L. J. Matos in *Dyestuffs*, which may be chiefly browns or blues, are finally worked up into outer garments, such as jackets, etc. For this class of work, modified cloth-dyeing machines are used; in fact, they are cloth-dyeing machines with the winch constructed more along the lines of a fluted roller than the customary "paddle." This departure from the general type of machine is such that injury to the face of the fabric is less than by any other form.

In the usual type of roll-dyeing kettle, where several strings are to be dyed at one time, it is necessary to see that the steam supply pipe is properly placed. It should extend the full length across the kettle, and in large kettles the down pipe from the steam line should be located midway from each end. This will ensure even steam supply for the bath. Where the steam supply is not evenly distributed, off-shades are of frequent occurrence, some rolls dyeing up either darker or lighter according to the amount of steam they receive. The rolls, as they come from the knitting machines, are made ready for dyeing by being first given a run in water heated to the boil, and containing from three to five per cent of soda ash. Some dyers recommend the use of caustic soda, but this latter seems to offer no particular advantage over soda ash. This treatment with alkali removes nearly all of the oil and dirt in the cotton. In the case of cotton and wool mixtures, the preliminary treatment is limited to that which would be applied to straight woolen goods, where soap and a moderate temperature would be used.

Referring to all-cotton goods, after the alkali boil, the rolls are thoroughly washed for 15 to 20 minutes without removal from the kettles, and with a steady in-flow of water. When the rolls have been washed, the kettles are filled to the proper level, and made ready for dyeing by the proper addition of dyestuffs, chemicals, etc.

Preliminary bleaching of roll goods is only resorted to for whites, or for rolls to be dyed very light, clear shades. The usual bleach bath consists of a solution of hydrochlorite standing at ½ degree to 1 degree Tw., until a sufficient degree of whiteness is attained. The rolls are then rinsed, soured with muriatic acid, again rinsed, and soaped warm.

Electrolytic bleaching has gained a very firm foothold in the knitting industry on account of its relative ease and uniformity of operation. Without discussing its technical details, reference may be made to its advantage over the old chloride of lime bleach, or the previously-mentioned "hypochlorite" bleach. Owing to the electrolytic decomposition of sodium chloride, no lime salts are present, as is usually the case with the above-named bleaches, and consequently no lime salts are found on the bleached goods, the presence of which were always troublesome for both the dyer and the finisher.

Peroxide bleaching is so well known for its clear whites and other features that it is unnecessary to go into details regarding it, except to remark that for wool and silk it has certain advantages not shared by other bleaching chemicals. Many bleachers make use of sulphurous acid in the form of sodium bisulphite for bleaching wool. This process takes the place of the old "sulphur-house" method, and is useful where fine wool is to be dyed bright, clear shades with the acid dyes.

Most roll goods are dyed with the direct dyes, and as a rule such colorings belong to the class known as "standard" or "staple"—and include certain shades that are the same from season to season, and which are handled in relatively large quantities.

The range of these shades is not extensive, and a few colors suffice. Where a variety exists it is among the special order shades, each of which is dyed in comparatively small batches. No special directions are necessary for the work; the dyer makes his selection of dyes, dissolves them in water, and adds the solution slowly to the kettle in successive portions so as to ensure even dyeings, finally bringing to shade by boiling, and with the addition of such other dyes for toning as experience dictates.

The use of soluble oil in dyeing cotton goods is important and desirable; when employed in moderate amounts, it causes a better penetration of the goods by the dye, and materially aids in securing level shades. Too much soluble oil is not actually detrimental, but is wasteful; the proper quantity to use is about one per cent on the weight of the goods, and should be added before the dissolved dyestuff is poured in. Besides aiding penetration and level dyeing, its use contributes much to the soft feel of the material when it is made up into garments.

For heavy shades on cotton and wool mixtures, the procedure is somewhat different. The dye or combination of dyes is gradually added to the bath, which is as short as possible, the volume being about three gallons for each pound of material to be dyed. The bath is charged with 2 to 4 pounds Glauber's salt per 10 gallons, the dissolved dye added, and raised to the boil; the pieces are then entered and run for about 20 to 30 minutes, when swatches may be taken for comparison. If the shade is not right, add further quantities of shading dyes, bring again to the boil, shut off steam, and run for a further 15 to 30 minutes, or until the exact match is secured.

If the wool does not come up properly, small quantities of an initial dyeing wool color is added, and dyeing continued at a simmer. As the bath cools, the color goes slowly on the cotton, a point to be taken into consideration when dyeing all classes of cotton and wool mixtures. Mixed material containing comparatively a large amount of cotton and a small amount of wool demands almost as much attention as 50-50 mixtures. The greatest care is required in dyeing those mixtures in which the woolen portion consists of kempy wool or some of the coarse grades of reworked wool. This applies more particularly to moderately heavy-knitted material for outer garments.

Put your knitting problems up to the readers of the "Knitting Kinks" section for discussion and solution.

The Yarn Market

Business seems to be picking up in the Philadelphia yarn market. September brought on a better feeling in everyone; there was apparent a definite anticipation of a healthier condition for the Fall than the market has experienced in some time. The reality of this belief was demonstrated in the fact that it obtained in spite of prevailing conditions that were rather to the contrary. The actual facts of the matter would appear to justify a continuance of the pessimism that has existed. On the other hand, however, there was an under-current of optimism for the long run that was rather general in the market. It was pointed out that just so soon as raw cotton became stabilized on a definite price basis, this fact, together with the apparent revival in business of all trades over the country, would affect the yarn market with a salutary result. It was believed that a number of large users of yarns, during August and early September, refused to make commitments for yarns even for business actually in hand, preferring to wait until later in order to secure more accurately an idea of the position cotton would permanently assume.

The varying reports that have been received as to estimates for the crop, with the resultant effect on raw cotton quotations, have in that way influenced the yarn market, which is ever sensitive to the antics of the staple. Directly as affecting the quotations, and indirectly as creating unrestful conditions and indecision, the lack of definite information as to the crop has adversely affected the market, and with more exact figures these obstacles, it is felt, will be eliminated from the path of a better demand at a profit.

According to some reports yarn prices during August and September went to the lowest level of the year, particularly with reference to the carded groups. This came after a gradual reduction that included some few upward spurts. In this report last month, 20s single skeins were reported at 45½ cents; while in the appended list the quotation is given as 42 cents. 30s two-ply warps are down almost a nickel from the quotation of 50 cents last month. Other published quotations seem to range in about the same proportion, with an average reduction of between two and four cents per pound.

It is of note, however, that the confused situation in the market removes the stamp of accuracy or authority from any list which might be published—except inasmuch as it indicates the general trend. The affairs of the market have seemed resolved into more of an individual selling proposition, and instances could be uncovered in which transactions were made based upon prices varying either way from any specified rating. With the attitude that has been assumed by the purchasing end of the market generally, local conditions of the case enter more largely into a sale than do the general observations made of the market as a whole.

While this was the condition existing during September, it was felt, as indicated, that later Fall would bring about a change. In the meantime, however, there is very little in the nature of fundamental changes to report—other than the optimistic attitude—as there has been a continuation of former conditions. In the business coming to market during the month, knitting yarns of the coarser counts seem to have done very well, carded numbers are still off, while the mercerized, combed groups seem to be bearing the large part of the burden of lack of demand.

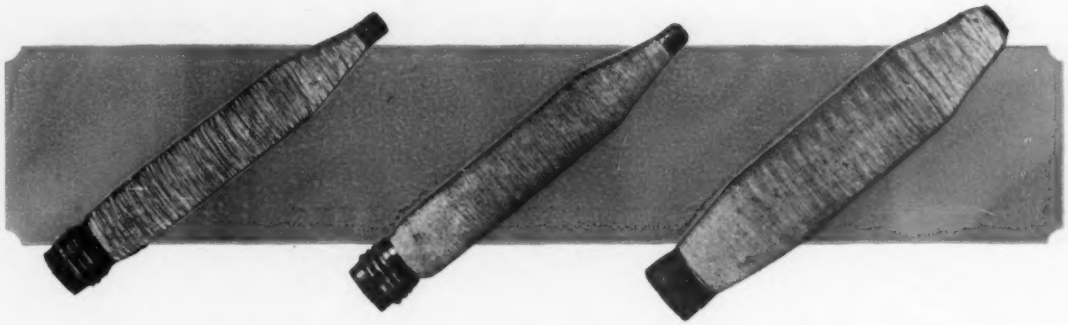
Following are quotations on the Philadelphia market on September 16:

Single Skeins.			
4s to 8s	38	10s	38½
14s	39½	16s	40
20s	41	24s	42½
26s	43	30s	44½
Single Warps.			
8s	38½	10s	39
12s	39½	14s	40
16s	40½	20s	42
26s	44	30s	46
40s	52		
Carpet and Upholstery Yarn in Skeins.			
8s and 9s 3-4 slacks	38		
8s 3-4 hard white yarp twist	35½		
8s and 9s 3-4 tinged tube	34		
8s 3-4 hard tyist waste	33½		
Two-Ply Skeins.			
8s	37½	10s	38½
12s	39	14s	39½
16s	40	20s	41½
24s	43½	16s	44
30s	45½	40s	52
Two-Ply Warps.			
8s	39½	10s	40
12s	40½	14s	41
16s	41½	20s	42
24s	44	26s	45
30s	46½	40s	53
Frame Spun Carded Yarn on Cones			
8s	37	10s	37½
12s	38	14s	38½
16s	39	18s	40
20s	40½	22s	41
24s	41½	26s	42
30s	44	40s	52
30s double carded	45	30s tying-in	43
Two-Ply Combed Peeler Skeins and Warps.			
8s to 16s	53	20s	55
24s	57	30s	60
40s	65	50s	68 @70
60s	72 @75	70s	85
80s	80 @95		
Mule Spun Carded Yarn on Cones.			
10s	42	12s	43
14s	44	16s	45
18s	46	20s	47
24s	48	26s	49
30s	50	40s	57
Mule Spun Combed Peeler Yarn on Cones.			
10s	49	12s	50
14s	51	16s	52
18s	53	20s	54
22s	55	26s	58
28s	59	30s	60
36s	62	38s	65
40s	67		

The publishers of Davison's Textile Blue Book announce the completion of the 37th annual edition with every mill report carefully revised. Besides the regular reports, which have been considerably augmented during the year, a separate list of the new mills is shown, which is useful in reaching new concerns. A list showing all mills with dye houses is a valuable feature.

Two editions are issued: the office size, and the handy edition, and the salesmen's directory. The volumes can be obtained from Davison Publishing Co., 50 Union Square, New York. The prices are: office edition, $7.50; handy edition, $5.00; salesmen's directory, $4.00.

The Newport Chemical Works, Passaic, N. J., has issued a new bulletin insert for its binder which covers the uses of Pinol and Isomerpin, and gives information regarding Posavon soap. This bulletin is in the nature of an instruction book on these three products. It details the use of Pinol in scouring and bleaching, and its use in combination with Posavon soap in the semi-silk industry, and for craping or crisping cotton, half-wool, half-silk and woolen goods. Another section describes fully the use of Isomerpin in dyeing, finishing, sizing and mercerizing alone, and with Posavon soap in printing with alizarine and other dyestuffs.



The bobbin on the left is spun with 1⅝" ring for shuttle, while the Universal Wound bobbin, illustrated in the center, practically identical in size, contains the amount of filling yarn spun with 2" ring, as shown in illustration at the right. It has been inspected and perfected to reduce cost and protect values in weaving. The compactness and increased yarn capacity of this bobbin illustrates one of the economies of preparing filling yarn for weaving by Universal Winding.

Don't spin Filling to fit a hole in a Piece of Wood

Spin to Spinning Limitations rather than to shuttle capacity

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AACHEN, GERMANY

The Knit Goods Market

With the last of the summer holidays duly observed and the swing of seasons in knit goods, a brisk primary market was the logical expectation. But September began with little improvement over August. Betterment was being deferred, although manufacturer and jobber were on tip toes for it. There were several explanations for the indifference manifest by buyers. First, and probably foremost, was the default in interest payments on the bonded debt of a large New England cotton goods manufacturing corporation followed by the passing of the quarterly dividend by another New England concern, manufacturing woolens. The latter ascribed the action of its directors in omitting the usual dividend to "severe depression in the textile trades."

Jobbers are not likely to operate freely when depression is given as a reason for withholding customary payments, and there was little interest in prices made for next season while the cotton report was being awaited. When this came out on September 8 there may have been some excuse for looking at the market as not settled, and further waiting was the result.

During the period of alarm and uncertainty—for which there really seems to have been no good reason—light weight underwear prices for the 1925 season were named by most of the mills, with few buyers present on the opening days. It soon became demonstrated as an actuality that the market was not firmly settled, for within a week price recessions came out. Two cuts of 12½ cents in each instance followed in close succession.

Besides the transient causes for jobber delay in starting the ball rolling for the fall of 1924 was the quadrennial stock argument on the side of extraordinary conservatism. Admittedly, political happenings preceding the elections in presidential years inspire caution, and this has been present in intensified form. Shrewd buyers make the best of a clouded future, and they were not sacrificing opportunity last month.

All things considered, the hosiery market held up well. Either mills were getting more business or manufacturers felt confident it was not far distant. A number of the mills in interior Pennsylvania which had been idle resumed operations and others increased their working schedules. A full fashioned mill in Philadelphia, which for a time was not operating, went on double shift with a part of the plant. But it was the opinion of some jobbers there had been little or no increase in retailer buying.

Jobbers are timid, and in their timidity are losing out in competition with mills selling direct to the retail trade. A representative manufacturer in this division, and in whose mill conditions doubtless are typical of those in most mills of the class, refutes the position taken by jobbers in the matter of buying by retail stores. This manufacturer, who is one of few to prove his verbal statements by his order books, shows that in August his sales increased by 17 per cent over July, when there was a gain of seven per cent over June.

It is refreshing to get figures telling such a tale of improvement, especially when they are coupled with a showing of an increase of 20 per cent in mail orders, which are accepted as a barometer of stock conditions among dealers. It will do no harm to repeat, and emphasize, what often has been said in the last several months, that merchants have reduced their stocks to a practically irreducible minimum. Orders for goods "at once, by express," disclose such a situation. One lot of hosiery shipped to a retailer by express on a hurry order was of 1,800 dozens. Orders like that do not come from merchants who are stocked.

Retailers are buying hosiery, regardless of what jobbers say. They are taking many small lots, frequently ordered to be forwarded by parcel post. They are not, however, doing much buying for distant deliveries. Forward orders are the rare exception, and in this respect there is little difference between the operations of jobbers and those of retailers.

Children's ribbed hosiery appears to be the banner seller among the various lines. A mill which improved on the construction of a staple number is this year selling more than twice as many cases as in 1923. Even the fine gauge combed, plain, full length, rib is moving in largely increasing quantities, and boys' three pound ribs have been in exceptionally strong call. The direct-to-retailer mills are selling hosiery, but it is for the fall months only, and no one is willing to venture a guess over his own name as to when dealers will be willing to place a few orders for spring.

Children's ribs are a big selling number for all classes of mills, and the jacquard top appears to be enjoying a big lead in volume of sales. Jobbers, while chary as to some lines, notably pure silk, predict bumper business for mills making the sport ribs in the more attractive patterns. For a few weeks there appeared to be a lull, which was ascribed to showings of innumerable new samples, often by manufacturers who had installed but a single machine and were experimenting. While they were trying out their innovations jobbers apparently jumped to the conclusion production was being too rapidly expanded, and hesitated, while waiting for price competition. Some of the experiments assuredly will prove failures, and the lines that have become entrenched in a season's successful selling will find a fine outlet, is the opinion of manufacturer and jobber.

Two manufacturers in Reading, Pa., are well supplied with orders for the sports ribs, the Max Pfau Hosiery Co. using machines of German construction, being reported sold up to the end of the year and assured of business in 1925. The Penn Hosiery Co. also is comfortably situated as to orders for the woven-in pattern goods, and the management is so enthusiastic over its volume of business and plain sailing that it is proposed to apply the principle to women's stockings of silk and wool.

Apparently it will require some getting away from last season's types of part wool hosiery for women to give it a standing of moment next winter. It seems not improbable that the woven-in designs will accomplish that end. In this connection it may be said that adaptation of this principle to hosiery is viewed as likely to curtail demand for the printed patterns, which at the moment are a feature of men's fancy socks. Two hosiery printers in Philadelphia report there is no abatement in interest in the printed and that their printeries, guaranteeing absolutely fast colors, are kept well supplied with orders.

Half hose of pure silk and tram silk in combination with artificial silk, particularly in the combination yarn,

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Granite State Latch Needles are doing their part to help them uphold this quality. They demand Granite State Needles because they know from experience that they are ALWAYS DEPENDABLE and enable the machines to run continuously and smoothly with fewer interruptions—they know that Granite State Needles don't break so often—they know their satin finish cannot fray the yarn as there are no rough latches—they know that every Granite State Needle is exactly like the previous one as they never vary in uniformity.

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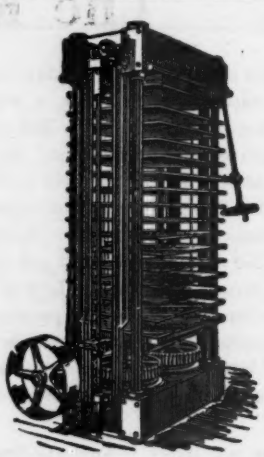

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have proven to be the most successful method for trademarking hosiery. We are glad to be able to claim a share in this success.

Our success is the result of giving to our customers the finest quality transfer—at the lowest possible cost. GET ACQUAINTED WITH CONTINENTAL PRICES before placing your next order on trademark transfers.

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Southern Representative
Knoxville, Tenn.

looks promising for winter wear, but fancies may prove a serious competitor. As some men addicted to silk socks exclusively wear two on each foot during winter, rather than temporize with socks of heavier fabric, Alexander & Irwin, hosiery jobbers, New York, have brought out for their comfort a knee-length very light weight and described as invisible, underhose of wool or worsted. This is practically the type of stocking worn by women under their silk hose when the north winds are whistling through the city canyons. It sells at one dollar per pair. If men take to it there is room for speculation whether they might not be persuaded to wear bloomers. These probably would appeal to the he flappers as a sort of reinforcement for the balloon trousers.

In women's silk hosiery, especially, the market situation is decidedly spotty, as to both full fashioned and so-called seamless of latch needle build. Price has much to do with conditions. Raw silk sold so low in the early part of the year that mills who bought at and near the bottom are in a position to quote very attractive prices. But it appears they are not giving away all of the advantage accruing to them by their opportune contracting, except when pressure to sell for converting goods into bank funds becomes severe. However, they make matters uncomfortable for manufacturers taking in silk at current prices. Most of these are looking for a return to near the low price level for the year, and jobbers also are waiting for it.

The smaller mills making full fashioned silk goods are operating more steadily—and selling their product—than some of the larger establishments. They have little difficulty in picking up immediate delivery orders for from a few dozens to a single case and, contrary to theory, seem to have a lower overhead cost. Two important mills closed down temporarily in early September because of lack of orders, while most of the small concerns were running along as usual.

Apparently the trend is toward tram and artificial silk in combination for women's hosiery, full fashioned and seamless, more particularly the latter, and several mills are about to bring out new numbers of such construction, with features. There is a good market for this class of stocking and for standard types priced on the low cost of silk some few months ago. A very good sheer stocking of all-over silk was shown as a $1.50 retailer. It was priced so low that buyers were skeptical, and the manufacturer probably will name a price high enough to force confidence in it and put it out as a two dollar a pair stocking. That seems to have become the established top price for first class full fashioned silk hosiery, with good stockings available at $1.50 and even as low as $1.25, if bought from distress stocks, which, by the way, do not appear to be as easy to find as in the early summer months.

Some important factors made preparation for a big sheer hosiery winter. It now looks as though they may have to revise their view, for it is coming to be doubted whether the very flimsy is going to be as popular as a year ago. It may hold a large part of its position with the aid of the invisible understocking provided it be complete. There is considerable objection to the omission of the foot, except as to the heel—just enough fabric below the ankle to keep the leg taut, presumably. Women say the sawed-off heel rolls, or creeps, causing discomfort, and their plaint, reaching the retailer, eventually finds its way to the mill, where the sheer question is being very carefully considered, especially so in view of kaleidoscopic style changes.

An effort was made last month, in conferences of a number of hosiery manufacturers and the Color Card Association, to eliminate a number of the disturbing shades, or at any rate to standardize colors, the almost endless variety of which was one of the explanations for the refusal of dealers to place orders for more than a few pairs each of the shades enjoying presumed mushroom popularity. Some progress was made at the conference, held in New York, but it is a question whether manufacturers will not continue to supply the distributing trade with almost any shade that may be suggested, standardized or running wild. Innovations in color probably will be no fewer than those in pattern and construction, desirable as it may be that such shades as moonshine, atmosphere, freckles, fog, etc., be stricken from the category.

Women's spring needle full silk hosiery, which may be said to be the nearest competitor of the full fashioned, continues to gain in favor. The stocking is liked for elasticity, appearance and price, and holds its popularity as a happy medium between the fashioned and the latch-needle build. A mill which recently installed 200 spring needle machines is selling double shift production, and is crowded with orders from large chain store establishments. Some manufacturers prefer the chain store to the jobber who distributes as a single unit or channel.

Jobbers as they are commonly known are the target for no little criticism by manufacturers complaining of their determination to not buy ahead and failure to function as distributors. One mill head, now specializing among chain stores, says he believes manufacturers not willing to build up selling organizations necessary for going to retailers direct, suggests the establishing of exclusively hosiery retail stores in all of the larger cities, after the manner of some of the shoe manufacturers. We have shoe stores, hat stores, candy stores and cigar and tobacco stores, which sell nothing else, the management points out, "so why not chain hosiery stores maintained by each of a number of large mills?" he asks.

The phenominal success of a number of manufacturers and others selling direct to householders through canvassers—salesmen is the more polite term which employers use when referring to their bell button pushers—may be accepted as warrant for the prediction there are going to be some radical departures in the merchandising of hosiery.

A fairly steady production of fiber hosiery has been maintained for the last six months, the output fluctuating only slightly from month to month and being but about 12 per cent less in July than May, when it was at about the peak for the present year. Lately demand has declined somewhat, the season for fiber goods usually showing a drop in the fall months, when artificial silk in combination with tram and mercerized comes into better call. A few mills using fiber with cotton base are having about the same volume of business prevailing during the summer, and some using tram and artificial silk in twist or plated also are receiving orders for practically unchanged quantities.

Using the reports of mills to the Department of Commerce as a basis for computation, the only increases of hosiery production in July, compared with March were in women's seamless silk and wool, about 90 per cent; women's full fashioned silk and wool, 24 per cent; men's silk and wool, 19 per cent, and seamless silks for women, around 12 per cent. Production of women's full fashioned silks

declined about 18 per cent, and in silk in combination with fiber and mercerized yarn slightly more than 50 per cent, in contrast with a drop of only 10 per cent in seamless silk in mixture. From this it would appear that full fashioned silk in mixture is not proving the success that was anticipated for it.

Cotton hosiery prices have held fairly firm, considering the more widespread use of silk. Quotations slipped somewhat on lower cotton, but this was due not so much to the decline in the raw fiber as to the diminishing use of cotton hosiery for men and women. Production figures supplied by fifty representative scattered manufacturers show a steady decline in output of mercerized, combed and carded since January, when, with possibly one or two exceptions, more machinery was being operated than in any succeeding month. These statistics have confirmation in the July report of the Department of Commerce and that of earlier months.

Perhaps the more gratifying feature of the Department's statistics is that dealing with total production and shipments as reported by about 350 manufacturing establishments. Comparing March and July, production of all classes of hosiery as a total fell off more than 50 per cent, while there was a decline of less than 25 per cent in shipments. Thus, it is shown, there was deep curtailment, which will be regarded satisfactory to manufacturers contemplating the near future markets. There was each month an increase in the number of idle mills, beginning with 24 in March, compared with 42 in July, the last month for which official figures were available at the time of making the analysis.

During September there developed a better market for mercerized half hose as prices were marked down to probably the last notch. A mill which had been holding for $1.75 for 200 needle full mercerized came out with a reduction to $1.60, and within a week had almost sold up to the end of October. Eight orders from jobbers in the smaller class totaled around 5,000 dozens, which was regarded representing right good selling.

Women's mercerized other than featured lines are one of the quietest things in hosiery, attractive only when offered at prices that spell loss for somebody. There is sale for certain well established lines, but the quantities going into distribution are negligible. One group of manufacturers reports a falling off in production by 40 per cent in July, compared with January. But this was a less sharp decline than was experienced in women's combed stockings, in which output was reduced by approximately 57 per cent, comparing with 83 per cent in women's carded.

On the theory that no money can be made in trying to sell what the consuming public buys principally as a matter of economic expediency, one after another manufacturer in Pennsylvania is discontinuing the manufacture of cotton hosiery, and recently one of the very large mills announced informally that it would give no attention to combed and carded goods and not much to mercerized.

Some interests say they believe that, as in hosiery, there is a strong trend in underwear that will leave the market oversupplied with certain knitted cotton staples in the moderate range. Notwithstanding the efforts of organized manufacturers last year and this year to exploit the knitted, for checking the inroads being made on their product by the cut-and-sewn woven goods, the latter are believed to be gaining ground. This is ascribed to the persistent advertising of trademarked lines from several mills and the tendency to lighter weights.

In support of the theory outlined, as to men's underwear in particular, it is pointed out that a New York State mill which a few years ago abandoned the manufacture of men's and boys' knitted garments turned the plant over to the production of women's silk and artificial silk garments, with the result that last year the net return was more than trebled. The manufacurer, however, is selling direct to consumers, through canvassers and otherwise.

The opening of light weight knitted underwear, at the start of the first week in September, for the season of 1925 proved somewhat disappointing. While bal briggans, considering the difference in the prices of yarns, are costing mills around 12½ cents a dozen more than when they opened in 1923, their prices were marked down by that much. This was satisfactory to jobbers, but they were slow to place more than sample orders, and within ten days quotations were around 37½ cents a dozen under last year's opening prices. This probably would have supplied a stimulus for better buying, but jobbers extracted comfort from the declines in cotton in the second week of the month, following the issuing of the cotton crop condition report.

One thing that jobbers overlook is that light weight cotton underwear would be cheap at current quotations even though cotton were to slip to around 20 cents. It will reach retailers before anything tangible in the way of information as to next year's bale crop can come out. Meanwhile, with cotton low enough to look safe to manufacturers, consumption doubtless will increase and, in sequence, price also, with the probability of a lessened acreage in 1925 because of the slump in cotton prices this year.

Cotton underwear at prevailing prices is viewed by careful observers of market performances in the past as a safe purchase for 1925 distribution. Unfortunately for manufacturers, who have learned by sad experience the danger of carrying stocks, jobbers start out as though intending to either force them to do so or taking chances with a possibly bare market later.

Some jobbers say they will go into the next season with carryover stock from this year, and they are not averse to expressing the opinion some manufacturers own goods made up for the departing season. Whether this view is well grounded, the fact remains retailers will finish the season with no goods to carry into next year. They have been buying very sparingly for filling in and many were known to be bare of goods when ordering a few dozens of assorted sizes. The retail trade will commence the next season with fresh goods, but neither manufacturer nor jobber seems disposed to hold the bag for all of them.

Several of the light weight mills are understood to have booked a fair volume of orders since the opening, and one in particular that expresses satisfaction with the business taken did not follow competitors in price reductions. This mill, in the Mohawk Valley in New York, makes somewhat distinctive lines of moderate price garments for men and ordinarily sells the same trade year after year. It is in only certain well entrenched lines that the bulk of the business to the middle of September was transacted. Jobbers have bought of lines that moved well this year and of which no goods remain in their bins. As to others, they are proceeding with much caution, and the outlook is for late big business in summer underwear, with the patience

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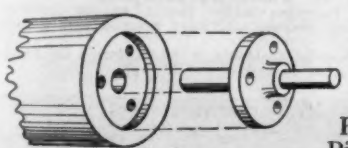
To Mills Using Immersion Rolls!



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of most manufacturers at present being taxed. But they have been accustomed to await the whims of the jobbing fraternity. Probably more than 60 per cent of the business in winter weights was held back until late in August.

Low temperatures were a boon to heavy weight underwear manufacturers during the first two weeks of last month, when jobbers for the first time since the opening showed real interest. At times there was a show of genuine activity. Mills were able to get their prices, with buyers more interested in the matter of deliveries than in trying to force further recessions. Jobbers say they look for no further declines on heavy weight prices. They are, however, placing few large orders, for the reason, they assert, retailers are unusually slow to make commitments. The latter are buying as though they were at the tail end of the season instead of the beginning.

Underwear manufacturers as a body will close the year with a poor showing as to profits due to lessened production and higher overhead costs by reason of operating part time and having occasional shutdowns. They are believed to be emerging whole from their hardest fight in many years. High prices will, it is believed, operate to the advantage of manufacturers of light weight garments. The tendency is toward summer weights for all-year-round wear and will, it is predicted, gather headway with each succeeding year. There would appear, therefore, to be a realignment in prospect for the knitted underwear industry, with more machinery being devoted to the manufacure of bathing suits and knitted outerwear.

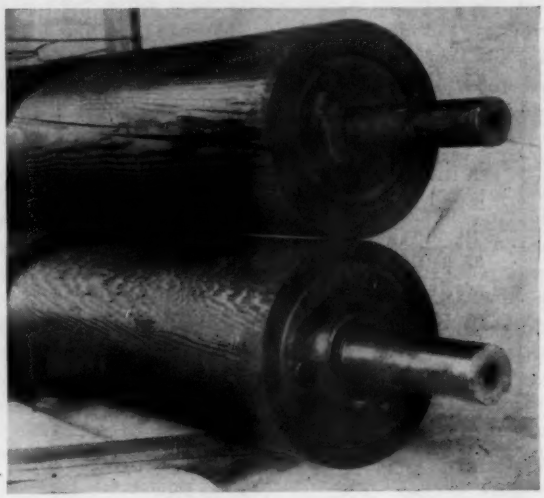
Indications were last month that sweater manufacturers as a class will finish the year in better shape than was forecast some few months ago. There came quite a revival in sweaters, and substantial duplicate orders are being placed right along. Manufacturers saw better things in store once they decided to cut out novelties of the extreme types and bended their energies on lines of garments that seemed to have become, in a way, stabilized. In fact, the market for practically all knitted outerwear lines has shown satisfactory improvement. Bathing suits for next year, which should be occupying the center of the stage, have not been moving so freely. Deep cuts in last season's prices were made, in some instances, as much as 20 per cent having been lopped from one line. But the average jobber, uncertain as to the remainder of this year, is going slowly in contracting for goods for 1925.

Rodney Hunt "Metal Cap" Rolls.

Small wood rolls, having moisture or alternating wet and dry conditions to contend with, are very susceptible to "checking." The condition is frequently aggravated by the methods used in building ordinary rolls, wherein the shaft anchorage is secured by the wedging effect of lag screws or wedges which have tendency to set up internal stresses.

In the Rodney Hunt "All Steel Cap" and "All Brass Cap" rolls, it is claimed, the end wood is protected from moisture and the expanding or splitting effect of shaft anchorage is overcome by forcing the metal cap into the end of the roll under heavy pressure and then wedging the shaft against the flange of the cap. In this way all the strain is designed to be borne by that portion of wood between the shaft and the inside of the metal flange.

This method of construction is shown in the attached illustration which is reproduced from a recent issue of "Roll Turnings," published by the Rodney Hunt Machine Co.'s Roll Department. Two rolls were made up from the



same piece of stock, one being ordinary construction and the other an "All Steel Cap." The picture shows very plainly how the checks developed in the roll not strengthened with the metal cap.

Getting a customer first is an investment. The profit you make on the business you do with him is a dividend.

"FALLS OF PERSONS" Again Leading

Whenever accident statistics are published covering an industry not heretofore reported accidents due to "Falls" invariably are among the first three causes and frequently lead all the rest.

FALLS ARE DUE TO UNSAFE CONDITIONS
LARGELY ON WALKWAY SURFACES

such as worn stairs, improper ladder treads, smooth drainage gratings and covers and slippery walkways covered with grease, oil or water.

The recent table of Industrial Accidents in the California Oil Fields is similar to those in other industries and shows:

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FALLS OF PERSONS—
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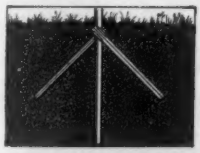
Fences That Defy The Elements

Anchor Post Chain Link Fence Erected for Crocker-Wheeler Co., Ampere, N. J., in July, 1907. Photographed November 1923.

Why they are FIRM



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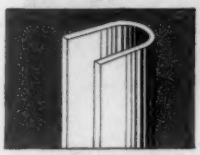
The posts are anchored in the ground like the roots of a tree. Neither frosts, thaws, nor heavy rains can disturb firm, gripping anchorage such as this.



U-Bar Posts
50% stronger than pipe, T- or L-bar sections. Made of high carbon steel—having no hidden surfaces where moisture can collect and rust form.

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After seventeen years of service—through rain, hail, wind storms, and repeating frosts and thaws—this sturdy Anchor Post Fence promises as many more years of unfailing protection.

As proof of the superiority of Anchor Post construction, this installation is but one of many that can be offered as indisputable evidence. If you are considering the erection of a fence, it would pay you to ask the nearest Anchor Post office or sales agent for the evidence in full.

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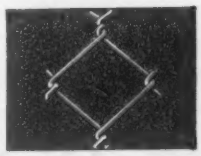

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Anchor Post Fences

FIRM-*because Anchored* PERMANENT-*because Galvanized*

INCREASE DRYING CAPACITY *NOW*
And Permit Expansion of Business

"HURRICANE" Dryers handle large quantities of goods in the shortest possible time consistent with highest quality work.

At the Elk Piece Dye Works, New York City, an order was received at 9 a. m., and the "HURRICANE" finished the work so that it was sent back to the customer at 1 p. m. This was done at a cost of $.0045 per pound; a saving of $.0164 per pound over the old method.

If you haven't a "HURRICANE" now, you will be interested in the actual cost sheets and reports that definitely show the profitable savings effected by other firms.

WRITE FOR FOLDER OF FACTS

THE PHILADELPHIA DRYING MACHINERY COMPANY

Manufacturers of Dyeing, Bleaching, Drying, Shrinking and Finishing Machinery

Stokley Street above Westmoreland **Philadelphia, Pa.**

Canadian Agents:
Whitehead, Emmans, Ltd.
Montreal and Hamilton

HURRICANE
Ideal Drying Every Day

New England Agency:
Hurricane Engineering Co.
53 State Street, Boston, Mass.

7 Distinct Advantages of the SARGENT YARN CONDITIONING MACHINE

1. Saves time, labor and storage space.
2. Maximum of three minutes exposure to set the hardest twist.
3. Prevents trouble from kinky filling.
4. One man can operate the machine, thus eliminating work of handling many boxes.
5. Being automatic in action, every batch of material receives same degree of conditioning.
6. Saves steam.
7. Absolutely prevents damage to bobbins.

—Write for illustrated catalog giving full information

C. G. SARGENT'S SONS CORPORATION

GRANITEVILLE, MASS.

Southern Representative: Fred H. White, Charlotte, N. C.

DURABLE K-W UNIVERSALLY USED

Value— Service

Genuine satisfaction from a product is the desire of every purchaser, and can only be obtained by the cooperation of two things given by the manufacturer—Value and Service.

Because of this we have each succeeding year added new names to our list of satisfied customers, at the same time maintaining the confidence of those whom we have long served.

The hundreds of K-W Machines which we have sold to Textile Mills have, by their long years of service, steadily built up a reputation that has made K-W synonymous with the "World's Best Dyeing, Bleaching and Scouring Machinery."

Our years of experience and the efficiency of our methods guarantee economy in first cost, and economy throughout a long life of efficient service under the severest usage.

The ever increasing number of textile men who insist upon K-W machines for their mills is ample proof of the efficiency and dependability of our newest models.

Tell us your finishing problems—K-W engineers are at your service and will gladly offer suggestions and answer any and all questions pertaining to any finishing problem you have, without obligation to you.

The
Klauder-Weldon Dyeing
Machine Company
Bethayres, Pa., U. S. A.
H. G. Mayer, Southern Agent,
Johnston Bldg., Charlotte, N. C.

KLAUDER -WELDON

DYEING - BLEACHING
SCOURING-MACHINERY

"The World's Best Dyeing, Bleaching and Scouring Machinery"

Clean, uniform starch of full strength, carefully made from selected raw material. Used by leading mills. Furnished in any desired fluidity.

STEIN, HALL & CO., INC.

61 BROADWAY, NEW YORK

Boston Charlotte, N. C. Chicago
Providence Troy Philadelphia

QUALITY AND SERVICE SINCE 1866

THE ARABOL MANUFACTURING CO.

OFFICES:
110 East 42nd St.
(New Bowery Savings Bank Building)
New York City

WORKS:
Brooklyn, N. Y.—Cicero, Ill.
—Brampton, Ont.

EXPORTERS—MANUFACTURERS—IMPORTERS

of any kind of materials for

SIZING SOFTENING FINISHING WEIGHTING

for all Textile Purposes

Sizing Tallows, Filling Materials, Printing and Stiffening Gums, Rosin Soaps, Dextrines

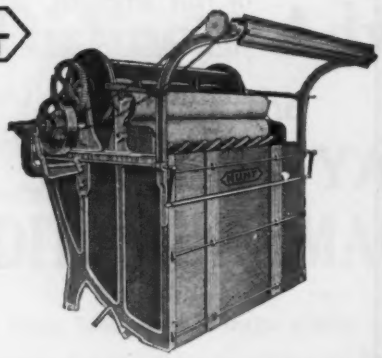
Soluble Oils, 50%-75% Guaranteed

Boil-Off Oil **Degumming Oil** **Hosiery Oil**

Many years' practical experience of our technical staff enables us to meet all your requirements. Our Textile Research Laboratories are at your disposal. Your correspondence and trial orders are solicited.

RODNEY HUNT MACHINE COMPANY

RODNEY HUNT



Rodney Hunt Reel Machine
for
Bleaching Artificial Silk

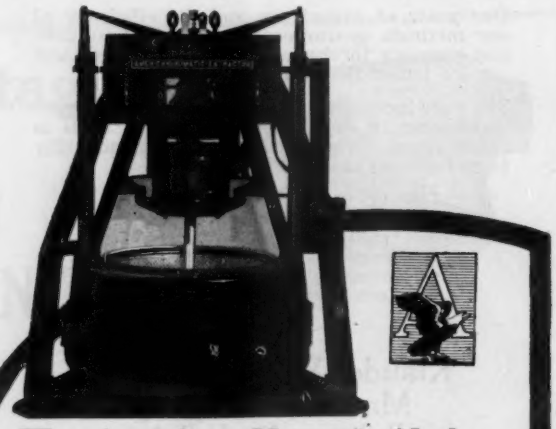
A 9-ft. machine handles sixteen to sixty-four strings each 100 to 225 yards long.

Two batches per day or better.

RODNEY HUNT MACHINE CO.

47 Mill Street **Orange, Mass.**

RODNEY HUNT



The American Humatic Hydro Extractor

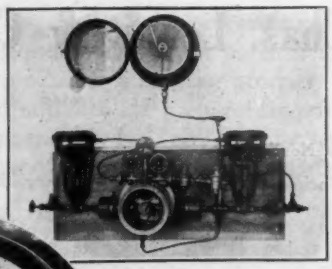
When you analyze from a standpoint of investment value the Humatic's perfect mechanical design and construction; its durability, and 10% greater basket holding capacity, you eliminate other extractors from consideration. Write for bulletins.

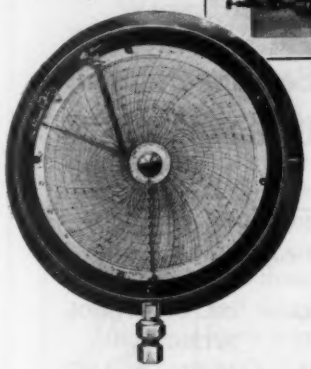
The American Laundry Machinery Co.
Specialty Dept. C. Cincinnati, Ohio
The Canadian Laundry Machinery Co., Ltd., Toronto, Ont., Canada.

The American **HUMATIC Hydro EXTRACTOR**

THE TEST

An 8-inch Foxboro Recording Pressure Gauge taken from stock, range 0 to 100 lbs. per sq. in., is connected between two motor valves operated by a pressure-time control mechanism which operates the valves alternately causing the pressure to rise from 0 to 100 lbs. per sq. in. and fall to 0 again in a definite cycle. The Foxboro Improved Helical Tube Movement produced





a perfect record of these hundreds of extreme pressure changes and shows no sign of fatigue or "set" at the conclusion of the test.

A Record!
106 Yards In 24 Hours

This was the record pen-travel of the 8-inch Foxboro Recording Pressure Gauge photographed above. From 0 to 100 lbs. pressure per sq. in. (maximum range) and back 240 times—480 distinct movements or a total distance of 106⅔ yards in 24 hours.

Ordinary gauges could have stood but a few hours of such treatment.

This test proves conclusively that the Foxboro Improved Helical Tube Movement is permanent in calibration. It does not weaken under the most severe service.

Your recording pressure gauges may never meet such a drastic test. But the ability to produce accurate records during long years of hard service calls for a standard of strength and resiliency found only in Foxboro Pressure Gauges and Thermometers. Foxboro temperature, pressure and humidity instruments are of the highest quality and are worthy of your confidence. For complete information write for Bulletin AS 98-2.

THE FOXBORO CO., Inc.

Neponset Avenue, Foxboro, Mass., U. S. A.
New York Chicago Boston Philadelphia Pittsburgh
Cleveland Rochester Tulsa
Los Angeles San Francisco Portland, Ore.
Birmingham—Brown-Marx Bldg.

FOXBORO

REG. U. S. PAT. OFF.

THE COMPASS OF INDUSTRY

6867

An Airplane View of the Home of Douglas Starch, Cedar Rapids, Iowa

DOUGLAS CROWN STARCH

SMOOTH and uniform, free from all impurities and foreign material. A thin boiling starch made especially for the textile trade. Produced in the most modern and perfectly controlled starch plant in America.

Douglas Crown Starch is the result of over 20 years of study and experience in the production of textile starch and its uses. It is essentially the most perfect starch made.

Douglas Starch is available in all special and standard grades—

DOUGLAS CROWN STARCH
(*A refined thin boiling starch*)
DOUGLAS PEARL STARCH
DOUGLAS POWDERED STARCH
DOUGLAS WARP SIZING STARCH
DOUGLAS LION MILL STARCH

Our representative will promptly supply samples and full information. Write to

PENICK & FORD SALES CO., Inc.

Manufacturers of Corn Products
CEDAR RAPIDS, IOWA

NEW ORLEANS, LA. MONTGOMERY, ALA. NEW YORK, N. Y.

Southern Representatives
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Rohm & Haas Company, Inc.

Manufacturers of

CHEMICALS

PHILADELPHIA, PA. BRISTOL, PA.

SODIUM HYDROSULPHITE—

Sulphoxylates and Allied Products.

LYKOPON—Sodium Hydrosulphite—
For reducing Indigo and vat dyes. Of highest quality and absolutely standard.

FORMOPON—For discharging.

FORMOPON EXTRA—For stripping.

PROTOLIN—For stripping.

INDOPON W—Indigo Discharge Assistant.

TARTAR EMETIC—Technical.

Represented by

The MAKENWORTH COMPANY
Greensboro, North Carolina

Chas. Lennig & Company

Incorporated

40 North Front Street Philadelphia, Pa.
Works: Bridesburg, Philadelphia, Pa.

Manufacturers of

Concentrated Sodium Sulphide

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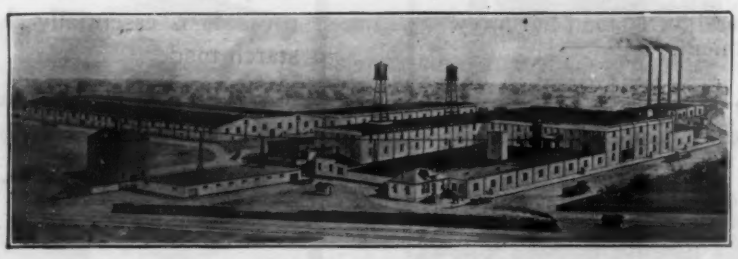
Also manufacturers of the following chemicals:

ALUM	GLAUBER SALT
SULPHATE OF ALUMINA—	OIL OF VITRIOL
Iron Free	NITRIC ACID
PAPER MAKERS' ALUM	MURIATIC ACID
WATER FILTRATION ALUM	NITRATE OF LEAD

Represented by

The MAKENWORTH COMPANY
Greensboro, North Carolina



VICTOR MILL STARCH

The Weaver's Friend

It boils thin—it penetrates the warps—increases breaking strength and carries the weight into the cloth. Being thoroughly washed free of gluten and other foreign matter it gives a bleach and finish to the goods that you can get from no other starch.

A trial order will convince you that VICTOR STARCH has no equal on the market.

THE KEEVER STARCH COMPANY, Columbus, Ohio

Southern Agent: MR. DANIEL H. WALLACE, Greenville, S. C.

If you are not already using VICTOR STARCH call on our representative for a demonstration at your convenience.

Building Business

One of the best methods of increasing business, and consequently profits, is to earn the reputation for producing a superior product.

Hundreds of mill men are profiting from the better appearance, softer feel, and brighter colors which the use of the special purpose alkalies

Wyandotte Textile Soda
Wyandotte Concentrated Ash
Wyandotte Kier Boiling Special

imparts to their yarns and finished products.

The camera and microscope quickly reveal the cause for these improved conditions, for when they are turned upon products treated with these materials, a splendid and superior condition of the fibers is instantly apparent.

They can perform the same service for you.

Ask your supply man.

The J. B. FORD CO., Sole Mnfrs.
WYANDOTTE, MICHIGAN

"BRETON" MINEROL

"BRETON" OILS FOR WOOL

"BRILLIANT OIL AX"

AT SPACES 247-248
(in the Annex)

We will exhibit at Southern Textile Exposition our several specialties for the lubrication of textile goods in process and of machinery in operation.

BORNE, SCRYMSER CO.
Established 1874
17 Battery Place, NEW YORK
BOSTON PHILADELPHIA
Works: Bayway, Elizabeth, N. J.

Grasselli Quality Dyes contribute to the support of the consumer industries.

Grasselli Dyestuff Corporation

117 Hudson Street, New York

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Clinton Corn Syrup Refining Company

CLINTON, IOWA

Manufacturers of Products from Corn
Including

STARCH

ALL KINDS OF MILL STARCHES
THICK AND THIN BOILING

Uniform in Application

VICTROLYN

Penetrating, Lubricating, Dependable Assistant in Warp Sizing

KLORASENE

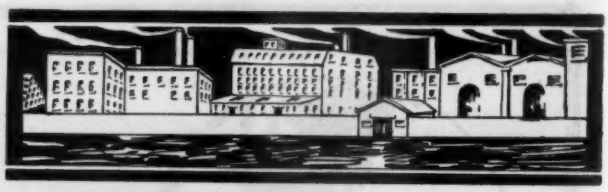
will remove Oil Stains.

If you are troubled, write us.

BOSSON & LANE

Manufacturing Chemists

ATLANTIC, . MASS.



Warren Soaps

Preferred Stock

The best quality tallow, palm, and red oils and olive foots, carefully balanced with the purest chemicals for your special purpose.

Uniformity guaranteed by test before shipment.

Warren Soap Warren Service

Warren Soap Mfg. Co.

Established 1870
77 Summer St. Boston, Mass.
Incorporated 1890

ROLLER CLEARER SLASHER

Quality and Service

CLOTHS

Manufacturers are obtaining such perfect results from our Roller Cloths because it is made of the right material, with just the right cushion and uniformity of surface.

Our Clearer Cloth is constructed of the highest grade materials with strong nap that does not pull out and its uniform length is such that rolls are cleared entirely of short fibre.

Our Slasher Cloth is of the same high quality construction. It has sufficient cushion and is porous enough to thoroughly force the sizing into the yarn.

A small trial order will convince you of the superiority of these perfect cloths. Ask for sample and prices.

PHILADELPHIA FELT CO.

FRANKFORD, PHILADELPHIA, PA.

Southern Sales Agent, M.C. Sanders, Greenville, S.C.

We Specialize
on
Design and Installation
of
FAN SYSTEMS
for
TENTER FRAME DRYING
and
VAPOR ABSORPTION SYSTEMS
for
DYEHOUSES

Let us design a new, or re-model your present drying system into an up-to-date efficient apparatus that will give maximum production.

SLOW DRYING MEANS LESS PRODUCTION

HUGH F. MUNRO & SONS

2406 North Mascher Street,
PHILADELPHIA, PA.

ENGINEERS AND CONTRACTORS for FAN SYSTEMS FOR EVERY PURPOSE

SMITH'S

Direct From Manufacturer To Consumer

TRADE 100% MARK

BETTER BASKETS

Are lifetime baskets. When the canvas wears out, all you have to do is remove the demountable rim and slip on a new Smith quality canvas container. This renewable feature makes the basket good as new and saves two-thirds the original cost of the basket.

The sturdy steel frame is practically indestructible and has cross slats and skids of wood.

Smith's 100% BASKETS are light in weight and will stand up for years under the hardest service.

Order one today and give it a trial—you will use no other.

SMITH MFG. CO., DALTON, GA.

The Unbroken Hum of Sure-Firing Looms

That's what Williams Shuttles mean to their users. For these specialties are an integral part of the looms they serve. They are made to coordinate perfectly—to stand the brunt which is theirs without murmur.

Williams Shuttles are the product of seasoned mill-wise men who thoroughly know the essentials of correct shuttle design and put them into practice. They are built with a ruggedness that is equal to their exacting performance. By the time these shuttles splinter or show other signs of weakening they well have earned their retirement.

We would like to have the opportunity of trying out our shuttles in your own weave room—to get the boss weaver's opinion of them. Write us.

The J. H. Williams Company

"THE SHUTTLE PEOPLE"

MILLBURY MASS.

Southern Representative: GEORGE F. BAHAN, Charlotte, N. C.

The Palmer Adjustable Thread Guide

For Ring Spinning and Twisting Frames

Easily Adjusted.

Extreme accuracy and permanence of setting.

Cheapest of them all.

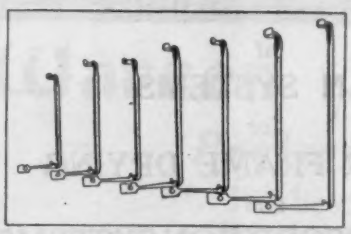
Mail guide-block for free sample.

Patented and manufactured by

THE I. E. PALMER COMPANY

Middletown, - - - Connecticut

Had Your Spinning Frames Inspected Lately?



It Pays

Frames out of line and level lower production, lessen profits and shorten the life of gears and rolls.

We have an organization of trained mechanics and the equipment to inspect your spinning frames and put them in 100 per cent running condition.

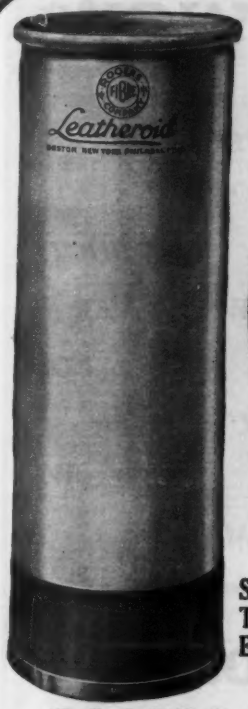
Many large cotton mills have us inspect and repair their spinning frames regularly. They find it profitable—So will you.

Southern Spindle & Flyer Co., Inc.

CHARLOTTE, N. C.

"We Manufacture,
Overhaul and Repair Cotton Mill Machinery"

W. H. MONTY, Pres. and Treas. W. H. HUTCHINS, V. Pres. and Secy.



ROGERS FIBRE COMPANY

Southern Textile Exposition

Annex 48-49

SOLD BY LEADING SOUTHERN MILL SUPPLY DEALERS

ROGERS FIBRE CO., BOSTON 121 Beach Street NEW YORK 78 Fifth Avenue PHILADELPHIA 1024 Filbert Street

Did you get our prices and samples on your last requisition for

LOOM REEDS (Woolen—Cotton—Duck—Plush)
HEDDLE FRAMES (With wood or iron ends)
HEDDLES (With or without inserted eyes)

We have been manufacturing since 1875 and during that time have helped many mills solve their weaving troubles. Why not let us put the experience we have gained by working out their problems at your disposal? Our plant is especially well equipped to take care of that *out of the ordinary* reed or heddle frame that you need in your line of work. *Don't wait.* Now is the time to get acquainted with the WALKER STANDARD of QUALITY and SERVICE.

WALKER MANUFACTURING CO., INC.

ESTABLISHED 1875

Kensington Ave. and Ontario St., Philadelphia, Pa.

Southern Office: 201 Augusta St., Greenville, S. C.

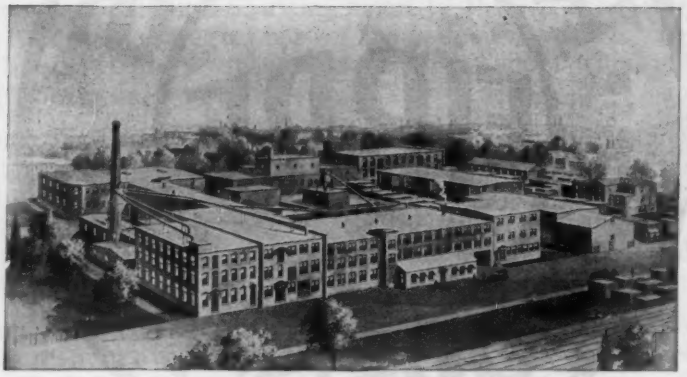
Bobbins Spools Skewers
Tubes Rolls
Manufacturers and Enamelers

OUR CUSTOMERS SAY

The careful attention that we give to the manufacture of their requirements means a stronger and more reliable Bobbin for them, while to us it means repeat orders.

We put all styles of reinforcements on Bobbins and Spools for conditioning of yarns.

All Bobbins enameled by our own process.



OUR PRODUCTS WHATEVER YOU USE WE MAKE

For service and prompt attention write us.

Walter L. Parker Co.
Lowell, Mass.

Shambow Shuttles Cost Less Than Ordinary Shuttles

When you figure the cost of a shuttle, you base your figuring on what it will do in the loom.

How much does a **"Smash"** Cost you?

How much does a stopped loom cost you per minute?

How much does a poor tip cost in the warp snips it causes?

How many yards of seconds do you produce?

A shuttle that contributes to these manufacturing costs is not cheap

No Matter What Price the Shuttle-Maker Quotes!

Shambow Quality is Obtainable Only in Shambow Shuttles

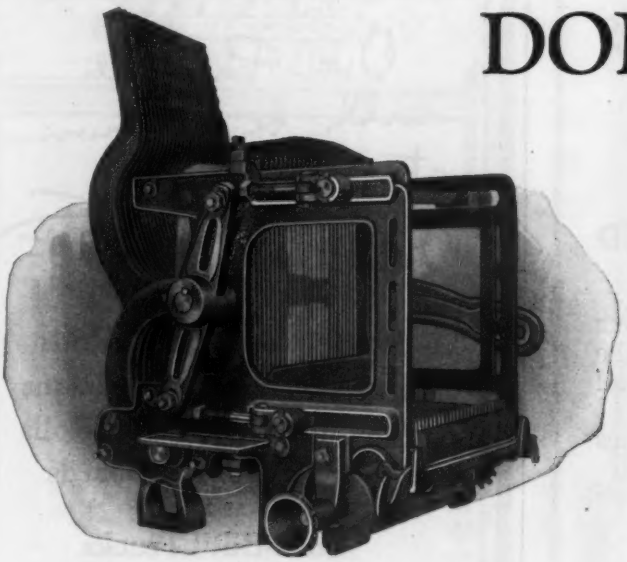
SHAMBOW SHUTTLE COMPANY

FACTORIES

WOONSOCKET, R. I.
John C. Shambow. Pres.

GREENVILLE, S. C.
H. H. Ulman, V. P. & G. M.

DOBBIES



Crompton & Knowles Double Index Dobby

We now equip dobbies of this type with pressed steel hook levers (patented) and drop forged top and bottom hooks (patented).

Slotted fingers and locking rod make it easy to remove, clean, and replace the fingers.

Crompton & Knowles Dobbies can be applied readily to any make or type of loom and will outwear any other dobbies on the market.

CROMPTON & KNOWLES LOOM WORKS

WORCESTER, MASS.

PROVIDENCE, R.I. PHILADELPHIA, PA. PATERSON, N. J.

S. B. ALEXANDER, Southern Manager, Charlotte, N. C.

Cold Rolled Steel Shafts in the

ALLEN COMPANY

OLD STYLE SECTION BEAM

Only cold rolled steel shafts are used in our Old Style Section Beams—this assures greater strength and longer life. Inside heads milled and forced on shaft under great pressure. Staves secured to inner heads by screws, holes being bunged to insure smooth surface on barrel. Finished with coat of best linseed oil for protection from moisture. May be used with any make of head.

Allen Company products tried under your own conditions, will prove profitable investments. Write for catalog showing our complete line—it's free.

ALLEN COMPANY, NEW BEDFORD, MASS.

Also Manufacturers

Wooden Beam Heads, Section Beams, Loom Beam Heads, Top Beams, Beam Trucks, Trucks and other wooden specialties.

Southern Representative: Carolina Specialty Co., Charlotte, N. C.

MORE
SOUTHERN SPINNERS
are using

AMTEX
TRADE MARK REGISTERED

SPINNING, TWISTING AND SPOOLER TAPE
Than ever before

This increasing demand indicates the superiority of AMTEX Tapes over all others.

We are pleased to build special Tapes for your particular needs.

Send us your specifications and we will guarantee satisfaction.

Manufactured by

AMERICAN
TEXTILE BANDING CO., INC.
GERMANTOWN, PHILADELPHIA, PA.
Sold in the South by
Charlotte Supply Co., Charlotte, N. C.
Wilson Company, Greenville, S. C.

Our Products will be shown at Greenville Oct. 20th to 25th

"Perfection" Shell Rolls
"Economy" Section Beams
Washburn Wood Top Rolls
"Kore-Lokt" Pin Boards
—AND—
"Steel-Bilt" Trucks

WASHBURN
IF IT'S ROLLS, WE MAKE THEM
NEW BEDFORD, MASSACHUSETTS

"Cotton Mill Machinery Calculations"

EVERY Textile Man should have these reference books. They cover in a detailed and thorough manner all calculations necessary to be made on any cotton mill machinery manufactured in the United States and constitute one of the best references on the subject obtainable.

The two volumes are illustrated with 45 diagrams and contain 21 reference tables.

As the value of a book lies in its contents and not in a fancy cover, we have put these two volumes out in a strong, serviceable paper binding. You can secure them free in conjunction with a subscription to COTTON.

Write for circulars and full information.

COTTON,
ATLANTA, GEORGIA

AMERICAN
SUPPLY COMPANY
ROVIDENCE, R. I.

Manufacturers of

LOOM HARNESS,
WEAVING REEDS,
OAK TANNED LEATHER
BELTING, STRAPPING,
ETC.

We make a specialty of Harness for Warp Drawing Machines

R.I.W.
REMEMBER IT'S WATERPROOF
REG. U.S. PAT. OFF.

BRIGHT PARTS

of machinery can be protected against rust in transit or while idle by the use of

"R.I.W." ANTI-RUST COMPOUNDS

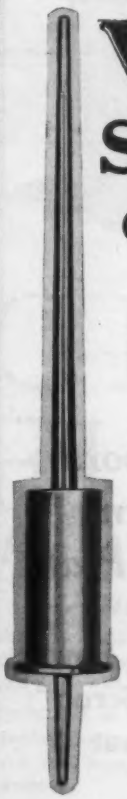
Easily removed when machines are put in use.

No. 1 Paste is recommended for the protection of machinery in transit and idle equipment. It adheres firmly and gives a stiff coating over steel surfaces and can readily be removed when desired.

Write Dept. F for details.

Lock Brothers INC.

ESTABLISHED 1848
Technical and Scientific Paint and Varnish Makers
110 EAST 42ND STREET, NEW YORK
Opposite the Grand Central Terminal
WORKS: LONG ISLAND CITY, N. Y.



WICACO SPINDLES

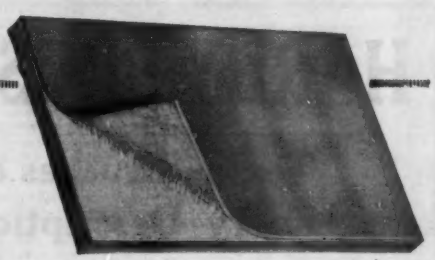
CUT YOUR COSTS

They stand straight at all speeds, holding bobbins in true alignment, thus maintaining high quality of product with evenness of twist, elasticity, and strength.

All Types and Sizes.

WICACO SPINDLES excel other spindles in rigidity and strength, enduring without permanent strain tests that make other spindles useless. Whirls are of one piece, unbreakable.

WICACO
SCREW & MACHINE WORKS, INC.
Stenton Avenue and Louden Street
Philadelphia, Pa.



A new material for mill trucks!

Why Haskins Veneered Steel is proving so successful

The photograph above shows a section of Haskins Veneered Steel. Note the outer strips which are made of galvanized steel, inclosing a wood core. A patented construction binds them closely together.

The Purpose of the steel
—is to make trucks which can ward off the severe blows encountered in daily mill use. It also provides a smooth surface which cannot injure or tear the most delicate of fabrics.

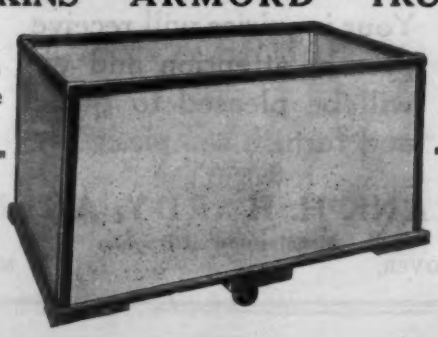
The Purpose of the wood
—is to keep the weight of the truck down so that it can easily be handled, and accurately guided about the mill.

The many years of service which Haskins Veneered Steel has given, fully justifies the claim that over ten years, without repairs, will be the average life of the new Haskins "Armord" trucks. Judging from the warm reception these trucks have already met with, they satisfy the real need which its owners recognized. Further data gladly sent on request.

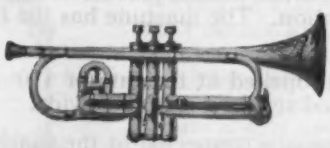
R. G. HASKINS CO.
520 W. Monroe St.
Chicago Illinois

HASKINS "ARMORD" TRUCKS

Trucks that are



"slam-ang proof"



A Band Helps to Make Contented Workmen

INDUSTRIAL bands are a great force for good—welding a body of employees together, inspiring loyalty, providing amusement and recreation and actually speeding up production.

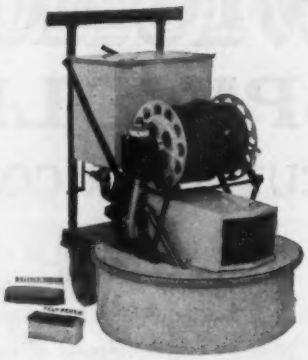
Conn will Help You Organize

We've helped to organize and have equipped hundreds of bands—our experience is at your service, without obligation. Conn instruments, easy to blow, beautiful in tone, perfect in scale, reliable in action—ideal for beginners as well as professionals.

JOHN PHILIP SOUSA *uses and endorses Conn instruments.*

Write today to

C. G. CONN, LTD.
1015 Conn Bldg., Elkhart, Ind.



Cleaned Scrubbed Floors an Advantage in Any Building or Plant

Our New No. 5 Eight Brush Power Scrubbing Machine Will Scrub Your Floors Daily without Effort or Drudgery

We have spent years in perfecting a practical machine that is almost perfect in construction and operation. The machine has the following features:

1. Self propelled at the rate of 110′ per minute and scrubs a path 26″ wide.
2. A squeegee connected to the machine conveys the dirty water to one spot where it is easily removed.
3. The machine sells for less money than any eight brush machine on the market.
4. Machine is guaranteed against breakage and is ball bearing throughout.
5. Machine is designed so that it is possible to scrub close to walls, corners, floor obstructions, etc.
6. Machine constructed so as to make for easy handling on elevators, etc.
7. Machine capable of carrying felt brushes (Write for particulars relative to this feature).

We Ship This Machine On Approval Any Where In U. S. Saving Of 50% In Floor Cleaning Expense.

D. R. VAIL & COMPANY

6754 SHERIDAN ROAD CHICAGO, ILL.

Cable Address: Vailco—Chicago

You All KnowThisBox

HARDY BRUSHES

Textile Brushes of Every Description

We specialize on

Cotton Comber Rolls

for both Nasmith and Whitin Combs

Furnisher Brushes

for Cotton Printing.

Your inquiries will receive prompt attention and we will be pleased to quote and furnish samples.

FRANK H. HARDY, AGENT

Manufacturer of Brushes

ANDOVER, MASS.

Guaranteed Textile Brushes

PERKINS PRACTICAL BRUSH

ATLANTA BRUSH COMPANY

George's "Ad"

George Snow is our service manager. He calls on our customers to see what sort of service our brushes are giving. For months he's been writing us that we should tell folks about the faults of pitch-set card brushes. Finally we told him to write what was on his chest and we'd print it for him.

Here is George's "ad" written by him word for word.

INFORMATION REGARDING RE-FILLING OF CARDING BRUSHES

Cotton was first spun on spinning wheels at firesides in the home. Brush making was also very crude and slow at that time. The only mode of construction known to the brush makers at that time was to set each individual bunch of bristles in the block by dipping in a composition of pitch and rosin, and immediately placing the bristles into the hole bored in the block, and this pitch would instantly become hard and crystallize—more and more so the older it got.

A brush maker, in dipping each bunch of bristles into this pitch necessarily is compelled to take up more pitch than is required to hold it in place. Therefore, the surplus pitch oozes up within the hole and forms ringlets around each bunch of bristles, and, in a very short time, when the crystallization process has produced the proper hardness, any little jar or coming in contact with any tool or any machinery, will cause it to chip off. And, when this happens, it would, of course naturally drop down into the top flats or the web, and will go from there on into the other processes of the preparation of this cotton, from the drawing frame and other machinery up to the spinning frame. And when this small particle of pitch, that has chipped off from the brush, comes in contact with any of the rolls, especially in the drawing frame, it either adheres to the roll or is firmly imbedded into the roving. In either case, the results are very bad.

Where the entire carding room is equipped with brushes of this construction, there are enough of these particles constantly going through the works to give the draw hands a lot of trouble and undue work to keep the flutes clean, but the most trouble that could be anticipated from this work would be caused by the comb in this spiral brush to drop down against the roll, and practically clean all of these ringlets of pitch from the entire brush is only a few minutes, which would seriously handicap the operation of this machinery and the other machines in the line of process.

This kind of work is not done by any of the people that build the machinery, and is not done by any reputable brush concern, and will only be found when used by some transient brush-maker. Our object in placing this letter before the mill people is to thoroughly acquaint you with what we know to be a dangerous process, and nothing saved except the time that it would take to ship these brushes to a reliable brush manufacturer.

If anybody desires any further information in regard to this letter, we will gladly supply it on receipt of an inquiry.

ATLANTA BRUSH CO.
ATLANTA, GA.

ATLANTA BRUSH COMPANY

A Brush for Every Textile Need

Gastonia, N. C. — Two of the Six Large Mills

Pawtucket, R. I. Manville-Jenckes Spinning Co.

CLEAN FLOORS

Help Attract Good Workers And Aid Good Work

"There is nothing that so demoralizes working men as a dirty shop," said Henry Ford in an interview. "A dirty shop drives away good men and attracts bad ones."

This is just as true in the textile field. The Manville-Jenckes Spinning Company, large employers of labor, with mills in the north and south, does much that is practical to maintain cleanliness.

This company, and more than three hundred other textile companies insist upon CLEAN FLOORS—obtained the only economical way—the FINNELL SYSTEM of Electric Scrubbing. The FINNELL SYSTEM in these mills insures floor cleanliness. It does not depend on human hands which tire and shirk. There are no pails of dirty water slopped on the floor and mopped off. There is a constant stream of clean water for every square inch—and the constant pressure of eight powerful brushes.

Free Booklet and Folder

Write for complete description of the FINNELL SYSTEM. Or ask for a private showing of our motion picture film.

Show Space 203, Textile Hall, Greenville, S. C., Oct. 20-25, 1924.

AMERICAN SCRUBBING EQUIPMENT SALES COMPANY

General Offices and Factories

510 COLLIER ST. HANNIBAL, MO.

Power Scrubbing Headquarters for Nineteen Years.

FINNELL SYSTEM

OF ELECTRIC SCRUBBING

"Clean Floors Reflect Clean Business"

COLSON

Quiet ball-bearing rubber tired trucks and casters

On Display at

BOOTH 707

Southern Textile Exposition

THE COLSON COMPANY

ELYRIA, OHIO

Manufacturers since 1885

BRANCHES IN ALL PRINCIPAL CITIES

Keeping the Lips From the Nozzle

Workmen need pure, fresh water and plenty of it. This keeps them feeling better and working harder. But be sure they drink from R-S Vertico-Slant Sanitary Drinking Fountains. It keeps their lips from the nozzle—and thus prevents drinking contamination which often arises from the lip-touched "bubbler head" of the average fountain.

Write for new Catalog F with complete information on the R S line. It includes specifications and prices of all R-S Fountains and is yours for the asking. Write for your copy now.

RUNDLE-SPENCE MFG. CO.

57 FOURTH ST., MILWAUKEE

R-S "Lips can't touch the R-S nozzle" R-S

ELECTRICAL SUPPLIES

GENERAL ELECTRIC CO.'S PRODUCTS—MOTORS, WIRE, WIRING DEVICES, ELECTRICAL, PORCELAIN CONDUIT AND FITTINGS, TRUMBULL SWITCHES.

Complete Stocks in Columbia for Prompt Shipment.

DISTRIBUTING GE JOBBER

PERRY-MANN ELECTRIC COMPANY

COLUMBIA, S. C.

Serving the Textile Industry

In warehouses, compresses, in mills of every description, in practically every manufacturing process throughout the immense fields of the textile industry Toledo Scales are in constant service—giving accurate weights, the basis of reliable cost and production figures; speeding up production; making the work easier; saving time; saving money.

Present-day conditions demand Toledo precision in the measurement of materials; Toledo's speed of operation; the elimination of the human element in weighing, an age-old cause of error; and Toledo's enduring quality. Modern industry appreciates too the competent field service promptly available to Toledo users through any of more than a hundred offices.

Toledo Scale Company, Toledo, Ohio

Canadian Toledo Scale Co., Limited, Windsor, Ontario

Largest Automatic Scale Manufacturers in the World

106 Sales Rooms and Service Stations in cities in the United States and Canada. Others in thirty-four foreign countries

Frictionless Building

THE DYEING PLANT

FOR

THE GREGG DYEING CO.

THE COST:—Nearly 10% below the lowest of a dozen other bidders.

THE OWNERS:—Unsolicited wrote us as follows:

"I wish to say the job is entirely satisfactory to us in every respect and it certainly has been a pleasure to do business with you. We hope at some future date, should we extend further, you will be the fortunate bidder."

Yours very truly,
Coles Phinizy, President.

THE ENGINEERS:—J. E. SIRRINE & CO. will tell you that this was a "FRICTIONLESS" job.

LAWRENCE CONSTRUCTION CO.

AUGUSTA, GA.

THE ELECTRICAL INSTALLATION AT

The GREGG DYEING PLANT

GRANITEVILLE, S. C.

made by

R. H. BOULIGNY, INC.

ELECTRICAL CONTRACTORS

CHARLOTTE, N. C.

Plans and Specifications by J. E. Sirrine & Company, Engineers, Greenville, S. C.

Serving Industrial Georgia with General Electric Products

TO give service that is second to none is as important to us as to supply our industrial customers with materials that are unsurpassed in quality. In the interest of prompt shipments, we maintain a complete stock of General Electric and other standard lines in our Atlanta and Savannah warehouses. Every order taken from our enormous stock is shipped the day it is received.

For twenty years, many of Georgia's industrial plants have depended without a single instance of disappointment in Carter Service for their electrical requirements.

DISTRIBUTING GE JOBBER

CARTER ELECTRIC CO.

Distributors

Atlanta **Savannah**

ESTABLISHED 1849

GEO. W. HARRIS CO.

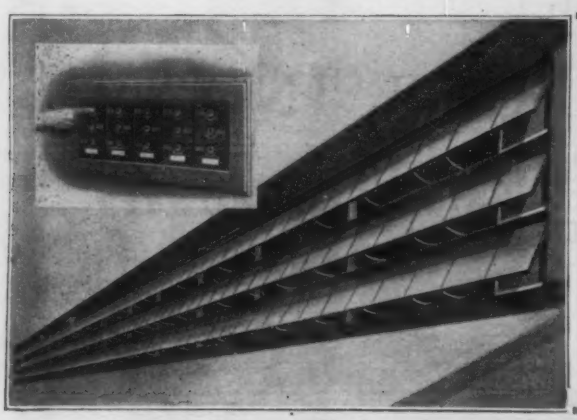
OLDEST MANUFACTURERS IN AMERICA OF

Loom Harnesses, Harness Twine and Mending Eyes

Our customers of 70 years ago are still our customers, and numbered among them are the largest mills in the world. The use of the highest grade materials, backed by 75 years of experience, assures products that will render the highest degree of efficiency and service. They are all guaranteed in every way.
We will be pleased to have a representative call on you and figure on your requirements for both prompt and future shipments.

199 PERKINS STREET **LOWELL, MASS.**

Southern Office: 201 Augusta St., GREENVILLE, S. C.



Callahan Sash Operators

HAND and electrically controlled for steel or wood sash in cotton mills, factories, warehouses, power houses, exhibition buildings, etc.

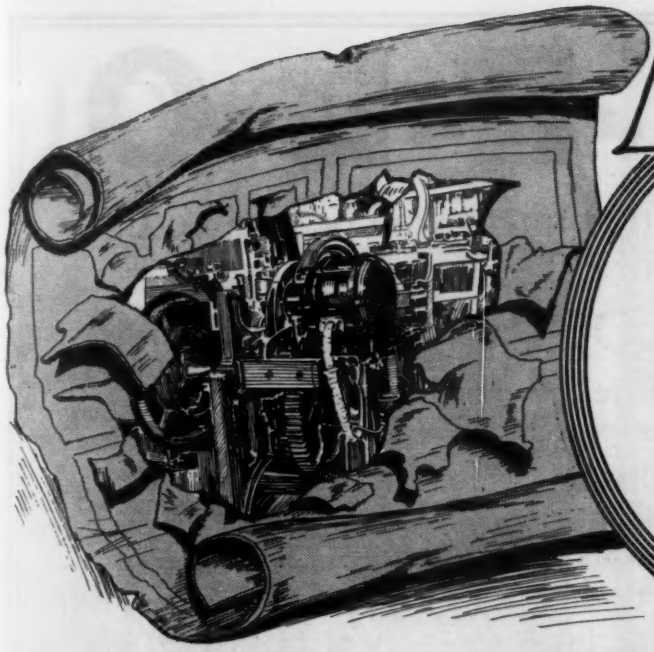
Callahan Sash Operators are neat in appearance,—positive in action—easy to install in either old or new buildings. Unusually long runs of sash are operated without variation in width of opening along the line.

Here is shown part of a Callahan Motor Drive installation. Two triple runs of top hung sash 150 ft. long and three multiple runs of center pivoted sash are operated from one central control panel.

Write for descriptive catalog and prices. Estimates gladly furnished from blueprints.

THE T. J. CALLAHAN CO.

804 South Perry Street Dayton, Ohio



Economy

ON ELECTRICAL WORK

never means cheap work, but rather getting the largest return for every dollar you invest.

The electrical power and lighting system of any mill represents an important investment —not only as to first cost, but also as to upkeep, maintained dependability, and safety. It is an investment too valuable to leave to just any electrical contractor.

Back of every H. & G. TROUBLE-PROOF ELECTRICAL INSTALLATION is the careful PLANNING AND SUPERVISION of experienced engineers, A BUYING POWER which insures you maximum economy in first cost, and a service which insures maximum efficiency and safety of your investment. H. & G. TROUBLE-PROOF ELECTRICAL INSTALLATIONS are driving or lighting more than two million happy spindles in leading Southern Cotton Mills.

Write us for information about them.

HUNTINGTON & GUERRY INC.
GREENVILLE, S. C.

HUNTINGTON & GUERRY TROUBLE PROOF ELECTRICAL INSTALLATIONS

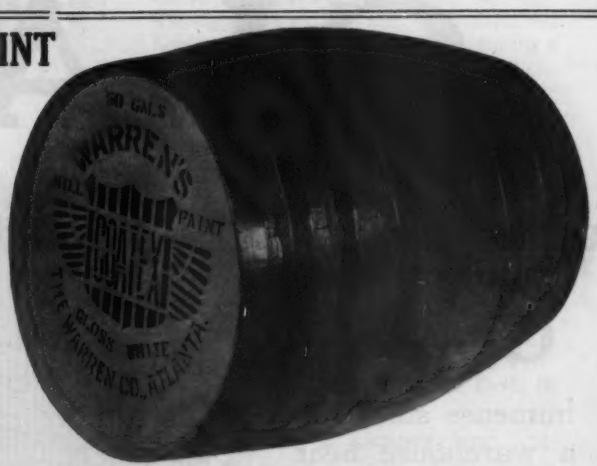
H & G TROUBLE-PROOF ELECTRICAL INSTALLATIONS

INTERIOR MILL WHITE PAINT

should possess when applied

Covering Capacity
Durability
Easy Application
Light Reflecting
Permanence
Sanitation
and
Whiteness

Such are the characteristics of
Warren's Coatex Brand



Manufactured by

THE WARREN COMPANY

PAINT AND GLASS DIVISION

875 E. FAIR STREET ATLANTA, GEORGIA

T-U-P-E-L-O

is a species of lumber that might well be said to be "grown to order" for

TEXTILE MILL FLOORS, PLATFORMS

and other places and uses where "wear and tear" must be expected and provided for. *Leave it to TUPELO!*

This Softwood Hardwood has an "involved" grain which keeps it from slivering or splintering. A TUPELO floor wears smooth because it wears little—always looks we , because TUPELO has a fine, white color and a satiny sheen.

We'll gladly tell you the whole, interesting story of TUPELO if you'll write and say "we're listening."? When? TODAY?

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION

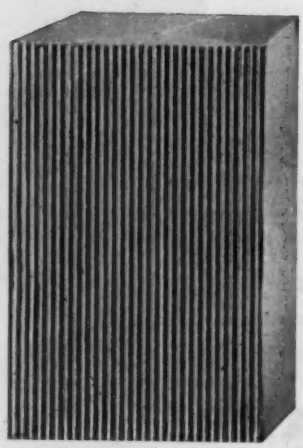
805 Poydras Building, New Orleans, La. or 805 Graham Building, Jacksonville, Fla.

(Please address the office nearest you)

GLASS

WINDOW GLASS

Immense stocks at a warehouse near you insure prompt delivery and minimum freight.



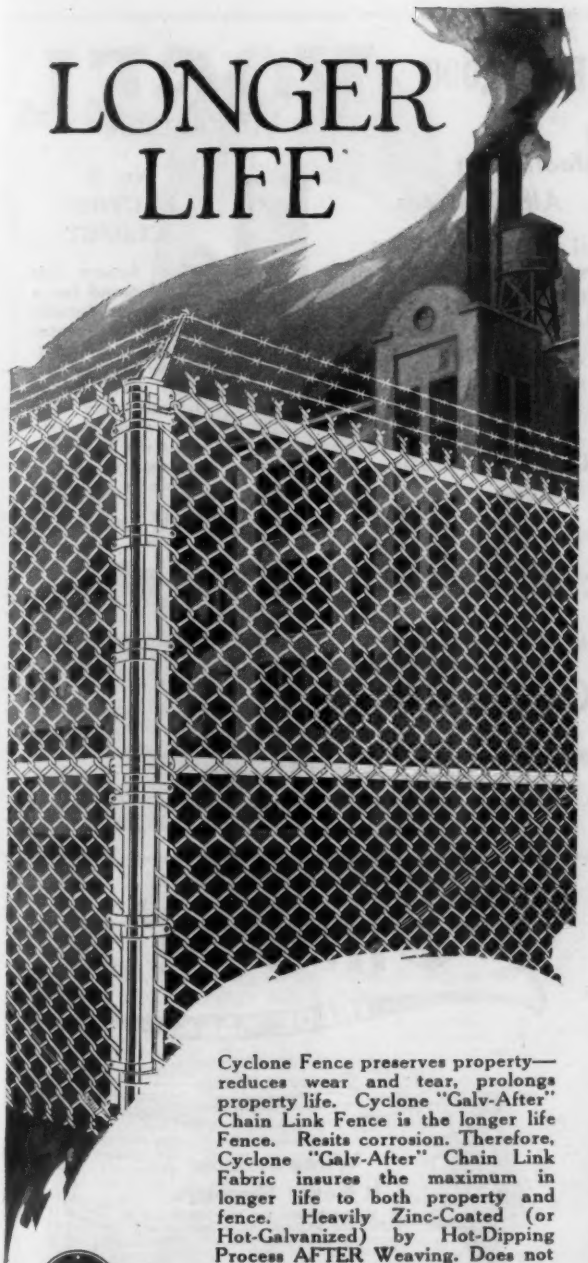
FACTORY RIBBED GLASS

Look over your mill before frosts and rough weather come. Get our low prices on your season's requirements.

F. J. Cooledge & Sons

Atlanta Savannah Charlotte

LONGER LIFE



Cyclone Fence preserves property—reduces wear and tear, prolongs property life. Cyclone "Galv-After" Chain Link Fence is the longer life Fence. Resits corrosion. Therefore, Cyclone "Galv-After" Chain Link Fabric insures the maximum in longer life to both property and fence. Heavily Zinc-Coated (or Hot-Galvanized) by Hot-Dipping Process AFTER Weaving. Does not require annual painting.

Write nearest offices Dept. 35 for complete information about "Galv-After" Fence, Cyclone Service and Cyclone Iron Fence for Industrial uses.

The Mark of Quality Fence and Service

CYCLONE FENCE COMPANY

Factories and Offices: Waukegan, Ill.; Cleveland, Ohio; Newark, N. J.; Fort Worth, Texas; Oakland, Calif. (Standard Fence Co.; Portland, Ore. (Northwest Fence & Wire Works).

Cyclone

"Galv-After" Chain Link

Fence Fabric

PROPERTY PROTECTION PAYS

100% satisfaction on a whole mill job

THIS letter from a big spinning mill is of real interest to textile men who buy or use belts:

"We have been using Graton & Knight Belting for the past five years and have found it very satisfactory in every way. Within the past twelve months we have equipped our new mill throughout with your Standardized Leather Belting and have not found a single belt but what has given us the best results."

The belting worries of that mill are over! The Standardized Series—a grouping of brands of Graton & Knight Leather Belts—has given them the right belts for the right drives, all through the mill. These sturdy leather belts will give years of service. And when replacement is finally necessary, this standardization again insures complete satisfaction.

Write for book 101-O, which tells the story of Standardized Leather Belts in the textile industry.

THE GRATON & KNIGHT MFG. CO.

Tanners—Makers of Belts and Other Leather Products

Worcester, Mass.

GRATON & KNIGHT

Standardized

LEATHER BELTING

Nothing takes the place of Leather

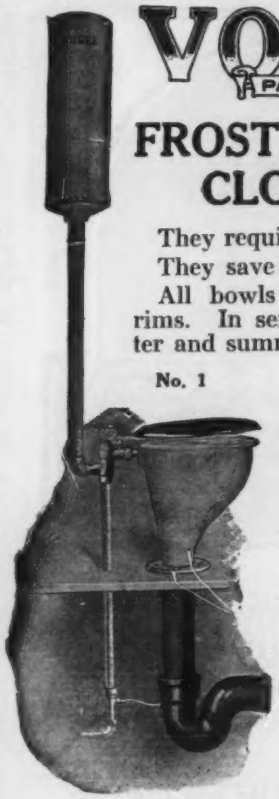
GRATON & KNIGHT

VOGEL PATENTED

FROST PROOF CLOSETS

They require no pit.
They save water.
All bowls have enameled rims. In service daily, winter and summer.

No. 1



OVER 350,000
Giving
Satisfaction in
All Climates

The ideal water closets for Factories and Mill Villages, where thousands have been installed.

The most durable water closets made — excepting none.

Every Fixture Tested Under Hydraulic Pressure Before Leaving Factory.

INSIST ON GETTING THE VOGEL

Ask your jobber

JOSEPH A. VOGEL CO.

Factory and Office at

WILMINGTON, DEL.

VOGEL PATENTED

No. 5 FACTORY CLOSET

This fixture fills the demand for a strong and durable automatic water saving closet outfit for factory use. The valve device is extremely simple and repairs, though seldom necessary, can be made by removing the valve cap back of bowl.

Mind the Q's

Quality

To be sure your SAND and GRAVEL comes on the job—washed, screened and sized to your specifications—insist on *Arrowhead* quality.

Quick Service

Plant capacity 4,000 tons daily. Dependable, adequate source of supply for you. Try us on the next order you place.

MONTGOMERY GRAVEL Co.

Plant 4000 Tons Daily — ARROWHEAD, ALA.

Shepherd Bldg. — MONTGOMERY, ALA.

Zemco-lite
TRADE MARK

White as Snow
It Never Discolors

It is remarkable the way ZEMCO-LITE will brighten the interior of a factory. This wonderful mill white diffuses light to every corner—minimizes shadows and is absolutely free from glare.

ZEMCO-LITE cements itself to the walls in a hard smooth coating which never discolors—is too smooth to catch dust—does not chip, flake, crack or fall off.

The first cost of ZEMCO-LITE is practically the last cost because its aggregate of White Portland cement renders frequent repainting unnecessary.

Let us send you information and prices of this wonderful mill white.

American Cement Paint Co.
Chattanooga, Tenn.

Zemcolite is also made in a variety of colors for every kind of interior or exterior painting. Color card will be gladly sent on request.

The Cement Paint

They never fail to back our claims

We claim that the Moccasin Bushing is the most reliable equipment you can install in your Textile Machinery, in loose pulleys or in any other bearing that has proved troublesome.

The Moccasin requires oiling but a few times *yearly*. It supplies clean, filtered oil to the bearing surfaces. It minimizes friction and lasts indefinitely.

There is no waste—no dripping of oil to damage floors, belting or stock.

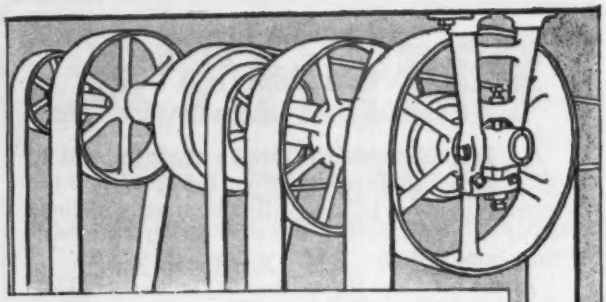
These are our claims and

Moccasin Bushings

have backed them up to the letter, as any of the following manufacturers will testify.

Anchor Duck Mills	Rome, Ga.
Avondale Mills	Birmingham, Ala.
Anthony Company, Bryan W.	Fall River, Mass.
Bibb Mfg. Company	Macon, Ga.
Brogan Mills	Anderson, S. C.
Butler Mills	New Bedford, Mass.
Columbia Textile Company	Lowell, Mass.
Crown Cotton Mills	Dalton, Ga.
Crystal Springs Bleachery Co.	Chickamauga, Ga.
Dallas Mfg. Co., The	Huntsville, Ala.
Dixie Spinning Mills	Chattanooga, Tenn.
Dixie Mercerizing Co.	Chattanooga, Tenn.
Dorranceton Silk Works	Kingston, Pa.
Dwight Mfg. Company	Alabama City, Ala.
Eagle & Phoenix Mills	Columbus, Ga.
Elk Cotton Mills	Dalton, Ga.
Erwin Cotton Mills	West Durham, N. C.
Flint Mills	Fall River, Mass.
Fulton Bag & Cotton Mills	Atlanta, Ga.
Hillside Cotton Mills	LaGrange, Ga.
Hillsborough Mills	Wilton, N. H.
Home Cotton Mills	St. Louis, Mo.
Jenckes Spinning Co.	Pawtucket, R. I.
Lullwater Mfg. Co., The	Thomson, Ga.
Manville-Jencks Co.	Pawtucket, R. I.
Massachusetts Mills	Lindale, Ga.
Massachusetts Mills	Lowell, Mass.
New England Southern Mills	LaGrange, Ga.
Peerless Cotton Mills	Thomaston, Ga.
Quissett Mills	New Bedford, Mass.
Richmond Hosiery Mills	Rossville, Ga.
Riverside and Dan River Cotton Mills	Danville, Va.
Standard-Coosa-Thacher Co.	Chattanooga, Tenn.
Shawmut Mills	Shawmut, Ala.
Spartan Mills	Spartanburg, S. C.
Thomaston Cotton Mills	Thomaston, Ga.
Trion Co., The	Trion, Ga.
United Hosiery Mills Corp.	Chattanooga, Tenn.
Unity Cotton Mills	LaGrange, Ga.
Victor-Monaghan Mills	Greer, S. C.
WeWst Point Mfg. Co.	West Point, Ga.
Willingham Cotton Mills	Macon, Ga.

MOCCASIN BUSHING CO.
CHATTANOOGA, TENN.



A Steady Load for An Even Thread

Well-laid-out **group drives** give the most uniform speed for driving spinning frames. Individual motor-driven frames are subject to speed variations when starting or stopping a frame on the same electrical line.

Group drives cut power bills—the power factor is high; and good leather **belts** on the drives throw the last ounce of power into your work. Take the cone drive on a roving frame: if a frayed substitute belt ever catches, your thread is spoiled—and cheap belts stretch and slip so that your yarn speed can't be even. Use good **leather.**

Read this:

Robert W. Drake, electrical engineer of the McCormick International Harvester Plant, has written a pamphlet on "When to Use Group and Individual Drives". He knows drives and belts—he has used nearly every kind of tool—**his pamphlet is practical.**

Tests which it has taken years to work out are at your finger-tips for the asking.

Use this coupon today—it has put money in other pockets—get yours.

LEATHER BELTING EXCHANGE
PHILADELPHIA, PA.

Nothing takes the place of

LEATHER

Address LEATHER BELTING EXCHANGE, 15
417 Forrest Building, Philadelphia, Pa.
Please send me a free copy of "When To Use Group and Individual Drives", Robert W. Drake, electrical engineer of the McCormick International Harvester Plant.

Name .....

Name of Firm .....

Adddress .....

City ..... State .....

Position held .....

RHOADS
TESTING LABORATORY
A SERVICE GLADLY GIVEN

A LARGE textile company recently sent to our laboratory sixteen belts, with trade marks removed but identified by marks of their own, to be tested for slip and power transmitting capacity.

In the lot were three Rhoads belts—two Tannate and one Gilt Edge. There were also six special tannage belts of different makes often offered in competition with Tannate.

The Tannate belts were best; and the Gilt Edge, though an oak belt, was near the top of the list.

One of the **best looking** of the special tannage belts, at 1½% slip, transmitted only 11 horsepower while Tannate under the same conditions carried a load of 28 horsepower.

The test results convinced the mill that Tannate is the best buy; and they placed an initial order for 800 feet.

Not only have they the assurance of these tests but also that of the Rhoads service guarantee.

It pays to use Tannate.

J. E. RHOADS & SONS

PHILADELPHIA: 29 N. Sixth St. CHICAGO: 316 W. Randolph St.
NEW YORK: 96 Beekman St. ATLANTA: 67 So. Forsyth St.
Factory and Tannery: WILMINGTON, DEL.

Stretched Laps Make Poor Work

And with ordinary rollers in the lap heads on lappers, the lap rod is so hard to turn that the lap is stretched by pulling hard enough on it to cause it to turn. Ball bearing rollers can be put in your present heads in a few minutes at small cost. Send us an order, giving the kind of lap heads you are now using.

ALDRICH MACHINE WORKS

Ball Bearings

Greenwood, S. C.

Approximately 1,500,000 Barrels "Royal Cement" Shipped Into Southeastern States Last Year

DIXIE PORTLAND CEMENT CO. ROYAL CHATTANOOGA, TENN.

Is tested in our laboratory every 60 minutes. The quality of our product is only equaled by our service in the handling of large jobs.

DIXIE PORTLAND CEMENT CO.
CHATTANOOGA, TENN.

CRESSON-MORRIS CO.

POWER TRANSMITTING MACHINERY
Merit Plus Recognition

"The heights by great men reached and kept were not attained by sudden flight."

Time, skill and effort must also precede merit as surely in machinery as in men.

Time, skill and effort must also precede merit in order to obtain and maintain for merit the recognition it deserves.

The great number of large installations of Cresson-Morris Power Transmitting Machinery is proof of both the merit and the recognition of the merit that nearly three score years of skill and effort have endowed it with.

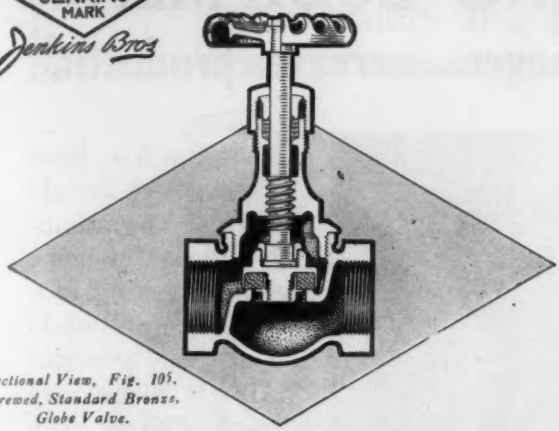
The cumulative knowledge of all this experience is always available to you in the recommendations of our engineers.

CRESSON-MORRIS COMPANY
ENGINEERS—FOUNDERS—MACHINISTS
PHILADELPHIA, PENNA.

Made for maximum service not merely the average

TRADE JENKINS MARK

Jenkins Bros



Sectional View, Fig. 105. screwed, Standard Bronze, Globe Valve.

Genuine Jenkins Valves

are made by

Jenkins Bros. Only

Fig. 325. Screwed, Standard Iron Body Gate Valve.

Four large factories are exclusively devoted to making Jenkins Valves and Jenkins valve parts.

The Bridgeport, Conn., factory, where the bronze valves are made, alone has 87,000 sq. ft. of floor space.

Adjoining the bronze valve division is the new five-story reinforced concrete building with a total floor space of 67,000 sq. ft. for manufacturing Jenkins iron and steel valves.

Fig. 143. Screwed, Standard Iron Body Angle Valve with yoke.

The Canadian factory is located at Montreal, and the factory for Jenkins Mechanical Rubber Goods at Elizabeth, N. J.

Jenkins Bros. alone make Jenkins Valves—and your only guarantee of getting genuine Jenkins service is to insist on genuine Jenkins Valves, trade-marked with the Jenkins Diamond.

JENKINS BROS.

80 White Street.....New York, N. Y.
524 Atlantic Avenue.....Boston, Mass.
133 No. Seventh Street.....Philadelphia, Pa.
646 Washington Boulevard.....Chicago, Ill.

Always marked with the "Diamond"

Jenkins Valves

SINCE 1864

ATKINS

METAL CUTTING SAWS

AAA NON-BREAKABLE HACK SAW BLADES FOR TEXTILE MILLS

Made with the usual hard edge, but with a soft back that practically prevents breaking. The edge is tempered so as to insure a cutting capacity equal to all-hard blades; therefore, while the blades will cut fully as fast and hold its cutting edge as long as the all-hard blade, the liability to break or snap off is entirely eliminated.

To those who have suffered a heavy loss on account of breakage, the AAA Non-Breakable Blade will prove extremely profitable.

ATKINS No. 10 HACK SAW FRAME

This is one of the most popular hack saw frames on the market. The hard rubber handle, easy-grip pattern, is hung low, thus directing the entire force of stroke on a line with the cutting edge of the blade. This increases the cutting power and gives the operator better control, preventing both injury to the hand as well as blade breakage. Frame of cold rolled steel, nickeled and highly polished. Adjustable to 8, 9, 10, 11 and 12 inch blades.

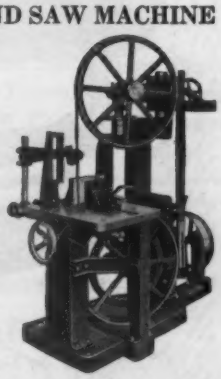
ATKINS No. 18 KWIK-KUT METAL CUTTING MACHINE

We now make a complete line of Kwik-Kut Metal Cutting Machines for cutting all sizes of stock up to 8 inches by 8 inches. The new No. 18 illustrated here is the latest, most up-to-date power hack saw machine on the market. It uses the entire length of the blade, thereby cutting a great deal more metal than any other machine. We also make smaller machines for smaller shops.

Write for our Bulletin KK-1 which illustrates and describes the complete line.

ATKINS NO. 3 METAL BAND SAW MACHINE

This machine is unsurpassed for economical cutting of metal where there is a sufficient amount of cold sawing to require the constant operation of one or more machines.



It cuts a very narrow kerf and is a production machine. All wearing parts are fitted with roller or ball bearings and grease cups which keep the machine properly lubricated.

We have a booklet, "THE SAW IN THE SHOP," which gives complete details. Write for it.

E. C. ATKINS & COMPANY

"The Silver Steel Saw People" Established 1857

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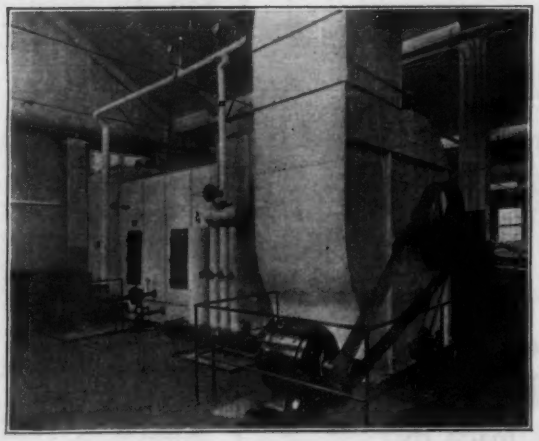
"Buffalo"

VENTILATING EQUIPMENT

reduces labor turnover—increases production

It has been proven when air in a mill makes people feel like work, they willingly and unconsciously work faster. This quality is imparted by Buffalo Fans and Carrier Air Washers which wash and temper the air.



Those who have lived where the air is fresh and stimulating feel at home when working in a mill where Buffalo Fans and Carrier Air Washers are used. They keep their jobs—you save greatly on labor turnover.

Buffalo Forge Company—Carrier Air Conditioning Co. of America

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The Coal Man Pays For Your Morehead System

In money actually saved on your fuel bill the Morehead Back-to-Boiler System will pay for itself many times over.

It will drain the condensation from your steam heated equipment and return it to your boilers as high temperature boiler feed water.

Our steam drainage engineers will gladly confer with you.

Morehead Manufacturing Co.

Dept. C, Grand River Ave. at Warren

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Morehead

"BACK-TO-BOILER-SYSTEM"

POSITIVELY DRAINS ALL TYPES OF STEAM APPARATUS DELIVERS CONDENSATION AND FEED WATER TO BOILERS UNDER ALL CONDITIONS AT MAXIMUM TEMPERATURE

(136)

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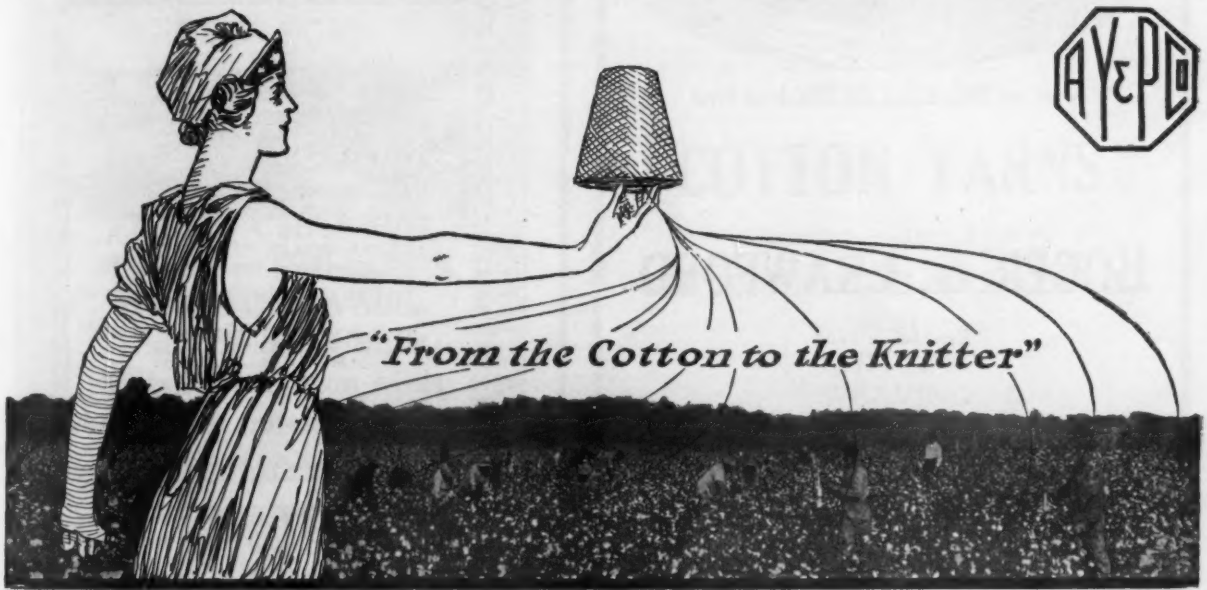

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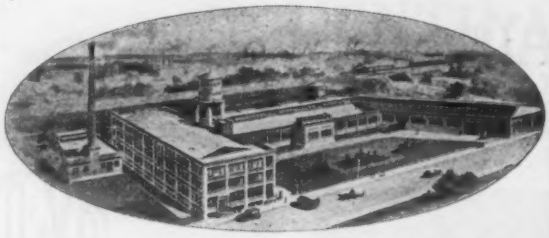

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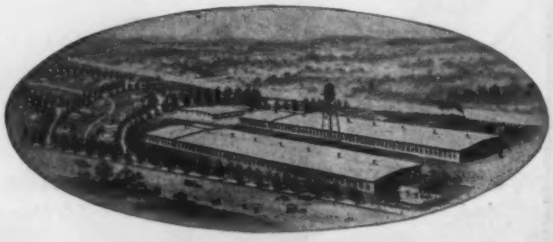

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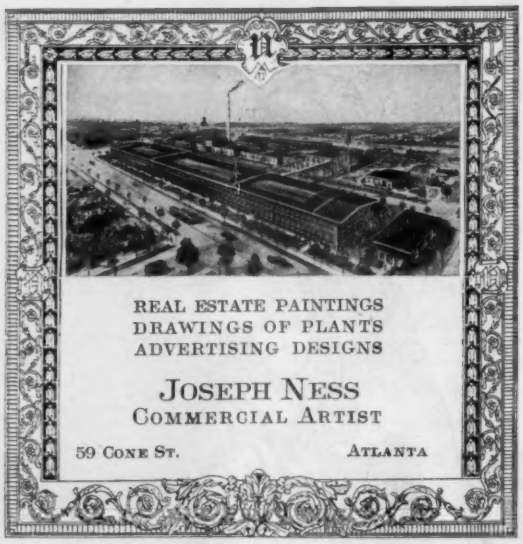

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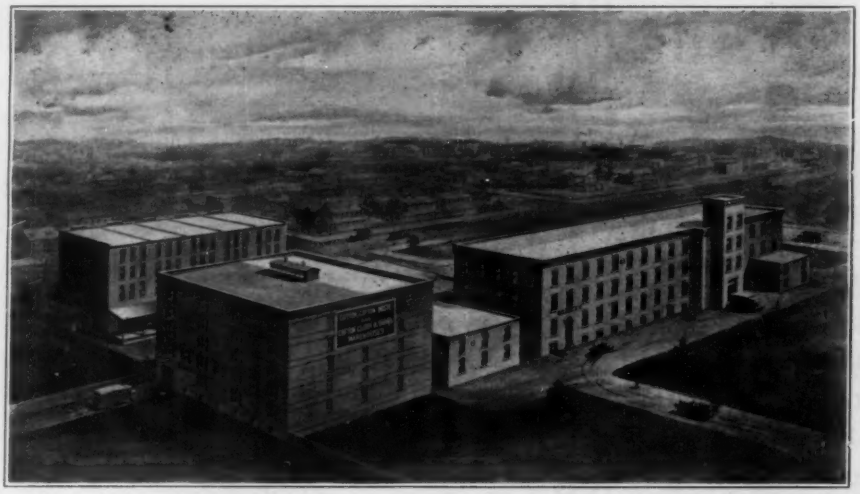

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Pioneers in providing mills with markets for waste

The Charles organization blazed the trail in providing textile mills (including knitting mills) with markets where waste products could be profitably disposed of.

Thirty-seven years of business have served to increase the number of our customers, and the variety of our interests. In this time we have earned a reputation for fair dealing and absolute reliability.

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DOUBLE CARDED
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CAMPBELL KNITTING MILLS,
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Corliss Automatic and Slide Valve

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Pumps, Hoisting Engines, Gas and Gasoline Engines.

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12,000 Spindle spinning and weaving mill, making coutils, jeans, drills, sheeting, bag cloth.

COMPLETELY EQUIPPED
EXCELLENT CONDITION
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Will accept a mill of about 5000 spindles in part payment.

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thoroughly experienced man with technical knowledge of designing and constructions of cotton textiles. State age, experience, salary expected, qualifications, etc. All communications will be considered confidential. Address

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Probably you, like many other mills, have some equipment which you have taken out or are thinking of taking out and replacing with new equipment.

Why not dispose of this second-hand machinery at a profit? COTTON is read by thousands of Cotton Mills that are hardly touched by Northern journals.

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to these mills through advertising in the Classified Advertising Section of COTTON. Such advertising produces results at small cost—why not try it out and get that second-hand equipment off your hands in a profitable way? Tell us what you have and let us insert an advertisement for you.

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GRANT BLDG., ATLANTA, GA.

FOR SALE

One tandem compound Corliss steam engine, made by Robert Wetherill & Company. H.P. 850; cylinder diameters, high pressure 24½", low pressure. 44"; stroke 60"; fly wheel diameter 24 ft.; face 6 ft. 4 in., grooved for 1¾" rope; crank shaft 18"; Rpm. 60/70; excellent condition. Address ARMSTRONG CORK CO., Camden, N. J., Attention Mr. C. W. Russ.

WANTED

Man to sell sizing, softener and other materials to Cotton Mills and Finishing Plants in the South. State full particulars as to residence, age, experience and salary expected. Address

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ENGLISH BROADCLOTH: SATINS: SHADOW STRIPES: VOILES, ETC., Manchester Buying Agent (buying only best Lancashire makes) solicits representation of first-class New York Brokers and Converters. Highest Bank and Trade References. Geo. E. Pappadimitriou, 16, John Dalton Street, Manchester, England.

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Most of the Equipment listed below has been used less than ninety days

POWER PLANT EQUIPMENT

12—823 h.p. Babcock & Wilcox Stirling water tube boilers. 200 lbs. pressure, Class M-30. Complete with Westinghouse stokers, forced draft fans, Vulcan soot blowers, and all accessories.

2—300 h.p. Heine boilers, 150 lbs. pressure. Murphy stokers and accessories.

2—500 h.p. Keeler boilers. Wetzel stokers and accessories.

2—42 x 11½ x 50 Birdsboro Hydro Pneumatic Accumulators. Designed for 300 lbs. air service. Equipped with Watson-Stillman Automatic Regulator.

4—15 and 26 x 20 x 24 Compound Duplex Laidlaw Compressors. Pressure 60 lbs. Capacity 2,570 cu. ft. at 150 r.pm.

1—160" Buffalo Steel Plate Induced Draft Fan, three-quarter housing, designed to work against 1¾" static pressure at 450° F. Left hand type, over hung blast wheel, water cooled bearings.

2—120" Buffalo Steel Plate Induced Draft fans, three-quarter housing, designed to work against 1¾" static pressure at 450° F. Equipped with wedge adjusting water cooled bearings.

10—Connersville 26" x 36" horizontal top discharge gas blowers, capacity 24.5 cu. ft. per rev. at 4.58 lbs. per sq. in. at 255 r.p.m. Mounted on cast iron bed plate with double outboard bearing. Pulley 16" x 72".

8—24" Buffalo Electric disc fans with single phase motors.

8—30" Buffalo Electric disc fans with single phase motors

2—No. 3 Root High Pressure Style D Blowers, top discharge, with displacement of 2⅜ cu. ft. per revolution, single geared with double outboard bearings on bed plates, 30" x 8" driving pulleys. Max. pressure 10 lbs. per sq. in.

4—Allis-Chalmers 18" x 36" 350 h.p. Corliss Engines. Heavy duty mill type, Double eccentric. Crown face fly wheel 11 ft. diameter by 32 in. face. Complete with Richardson-Phenix oil filtration and lubricating system. Left hand type only available.

2—No. 30 Schutte & Koerting Multi Jet condensers. Steam inlet 38". Water inlet and outlet 14". Equipped with 4" Vacuum breaker. Designed to produce 24" mercury when condensing 33,000 lbs. of steam per hour with 3,000 g.p.m. condensing water at 92° F. at 9 lbs. pressure at condenser jets.

1—No. 5 Allis-Chalmers vertical jet condenser.

1—Ross surface condenser, size 200.

8—Patterson-Allen closed water heaters. Capacity 30,000,000 B.T.U. per hour or 470 gallons per minute. Size 44" diameter x 10'2" long.

4—Patterson-Allen closed water heaters. Capacity 8,000,000 B.T.U. per hour, or 126 gallons per minute. Size 24" diameter x 8'6" long.

3—Warren Webster open type, 11,000 B.H.P. feed water heaters.

3—Cochrane 8" extra heavy live steam separators.

1—Cochrane 24" oil separator.

10—Swartwout Hydromatic steam traps, size 1½ in., pressure 30 lbs.

250—Swartwout Hydromatic steam traps, size ½ in., pressure 150 lbs.

10—Swartwout Hydromatic steam traps, size 1 in., pressure 100 lbs.

COTTON DRYING APPARATUS

15—No. 24 six section 8' Sargent cotton dryers.

15—48" Sargent Mixing Pickers.

15—Special Sargent cotton washers or rinsers.

15—Sargent 48" Model "M" feeders for Sargent dryers.

6—Noble and Wood concentrators, 44" diameter, 42" length.

GENERAL EQUIPMENT

1—110' Link-Belt fixed radius crane, 5½ yd. bucket.

5000—12" and 18" car wheels with 36" gauge axles and Hyatt roller bearings.

1—Otis freight elevator, 3,000 lbs. Capacity, 31' travel, car 11'7" x 7'11" and 12'9" under beam. Otis engine and motor.

1—Otis freight elevator, 6,000 lbs. capacity, 36'2" travel, platform 10' x 10'2". Otis engine and motor.

2—36" x 54" x 96" American Kinyoun-Francis Steam and Formaldehyde disinfectors, radial arm door at each end, vacuum type formaldehyde ammonia generator.

125—Motors, ¼ to 150 h.p., 2 phase, 60 cycle. Write for Bulletin No. 21.

45—Transformers, Single phase, 60 cycle, 10 to 600 KVA.

4—35 KW. Burke motor generator sets.

1—40 KW. Sprague belt-drive generator set.

1—30 KW. Crocker-Wheeler belt-drive generator set. Our Bulletin No. 21, Electrical Equipment, covers a large stock of motors, transformers, conduits, panels, switches, receptacles, switching devices, lightning arresters, oil circuit breakers—all new or practically new equipment.

100—Platform scales, 10, 60 and 100 ton capacities, for truck, tank, and track. Write for Bulletin No. 20, Scales.

1—General Electric MG-3 500 ampere Arc Welding Set. Complete and ready for operation. Mounted on two 36" gauge cars.

5000—Double-deck steel bunks. 30" wide.

1—4" Landis pipe machine.

2—No. 2 Oliver Universal wood trimmers.

1—250 lb. Chambersburg steam hammer.

1—Fay & Egan No. 33 side planer.

1—24" Vance Re-Saw.

1—30" Fay & Egan double surfacer.

1—No. 211 Brandeis portable cut-off saw.

2—Fay & Egan 42" Swing cut-off saws.

1—32" Hill-Curtis gang edger.

5—2⅛" Type A American Centrifugal pumps.

3—3" Type C American Vertical Centrifugal pumps.

8—3" Baker Centrifugal pumps.

32—4" Baker Centrifugal pumps.

8—5" Goulds Centrifugal pumps.

16—6" Baker Centrifugal pumps.

3—3 x 2¾ x 3 Worthington Duplex pumps.

2—5½ x 4¾ x 5 Worthington Duplex pumps.

41—6 x 2½ x 6 Worthington Duplex pumps.

3—8" 3 Stage Alberger-Curtis Steam Turbine driven boiler feed pumps.

10—25 and 38 x 4⅝ x 24 Worthington Tandem Compound Duplex pumps.

2—10" Type S, Allis-Chalmers Centrifugal pumps with 150 h.p. motor.

5—No. 3 Douglass Diaphragm hand pumps.

9—No. 3 Humphreys Diaphragm Hand pumps.

5—3" Goulds Diaphragm Hand Pumps.

5—4" Barnes Diaphragm Hand pumps.

9—4" Domestic Diaphragm pump with 2 h.p. Gasoline Engine (on truck).

6—4" Domestic Diaphragm pump, with 1½ h.p. Gasoline Engine (on trucks).

13—4" C. H. & E. Diaphragm pump, Gasoline Engine driven (on skids).

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12—Kellog Hammer Welded Steel Autoclaves, 300 lbs. working pressure. Recommended for use in the manufacture of Diphenylamine, Dimenthyaniline, Para Amidophenol, Anisidine, Phenetidine, Phenacetine, Alpha-Naphthol, Amido-Naphthol Sulfonic Acids, H-Acid, Gamma Acid, Beta-Naphthylamine and its sulfonic acids, and many others.

1—18" Iron Type Sperry filter press. Used but in good condition.

2—Special 7,000 lb. nitrators, consisting of steel tank, stirring apparatus and coils.

1000—Tons Duriron pipe and fittings.

30—6000 lb. Catenary Type Nitric Acid Retorts. 8' inside dia., 9' inside depth. Shell 1⅛". Equipped with cover.

50—8" Centrifugal submerged acid pumps.

2—Sets, 3 wringers to a set, 36" belt-driven centrifugal wringers.

60—42" Centrifugal wringers, direct-connected to 40 h.p. vertical motors.

3—Dorr Re-Action Tanks, 10' x 10', complete with agitators and steam coils.

3—Sulphuric acid plants, complete or in part. The process employed follows the essential principles of the Grill'o-Schroeder system, although it differs mechanically from the usual contact plant using that system. Conversion is accomplished by the use of platinized magnesium sulphate as a catalytic agent. Equipment includes three Glen Falls Sulphur burners, 48" dia., 20 ft. length, with standard Glen Falls combustion chambers 7'6" in diameter and 10 ft. high. Rated burning capacity each 1,200 lbs. per hr. Also equipment such as pressure filters, spray catchers, coke filters, towers, cooling pipes, feeder-boys, chain buckets, elevators, etc.

Equipment for nitric acid plants, including Hart condensers, retorts absorption towers, condenser tubes, retort fire box doors, grates, flues, retort cars, valves, fittings, storage tanks, duriron pipe and fittings.

Write for prices and specifications.

NASHVILLE INDUSTRIAL CORPORATION

OLD HICKORY, TENNESSEE

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Hardeman, Isaac.
Parks-Cramer Co.

AIR COMPRESSORS.
(See Compressors.)

AIR CONDITIONING SYSTEMS
(See Humidifying Apparatus.)

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ALKALIES.
(See Dyestuffs and Chemicals.)

ALUM.
(See Finishing and Sizing Materials.)

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(See Dyestuffs and Chemicals.)

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Robert & Co.
Stirrine, J. E.

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Jacobs & Co.
Nous, Joseph.

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Proctor & Schwartz, Inc.
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Sargent's Sons Corp., C. G.
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White Co.

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Smith Mfg. Co.

BABBITT METAL.
Ryerson & Son, Inc., Jos. T.

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Smith Mfg. Co.

BAGS (COIN OR MONEY).
Smith Mfg. Co.

BAGS (COAL).
(Smith Mfg. Co.

BALL BEARINGS.
Aldrich Mch. Works.
Dodge Mfg. Co.
Fulton Supply Co.
Fafnir Bearing Co.
Hyatt Roller Bearing Co.
Skayef Ball Bearing Co.
Strom Ball Bearing Mfg. Co.

BALL BEARING HOUSINGS.
Aldrich Machine Works.
Fafnir Bearing Co.
Fulton Supply Co.
Strom Ball Bearing Mfg. Co.

BALL WARPERS.
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BALE BAND BUCKLES.
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BALE OPENERS.
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BALING MACHINES.
Crompton & Knowles Loom Wks.
Draper Corporation.
Economy Baler Co.
Logemann Bros.
Saco-Lowell Shops.

BALING PRESSES.
(See Presses.)

BANDAGES, TAPES, ETC.
American Textile Banding Co.
Weimar Bros.

BANDAGE & TAPE MACHINES
Easton & Burnham Mch. Co.
Foster Machine Co.
Whitin Mch. Wks.

BANDS.
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BANKS.
American Trust Co.

BARS (IRON AND STEEL).
Ryerson & Son, Inc., Jos. T.

BAROMETERS.
Taylor Instrument Co.

BASKETS—CANVAS.
Smith Mfg. Co.

BASKETS—STEAMING—CANVAS.
Smith Mfg. Co.

BASKET—TRUCKS—CANVAS.
Smith Mfg. Co.

BASKETS—FIBRE.
Rogers Fibre Co.

BASKETS—MILL—METAL.
Haskins Co., R. G.

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BEAMS.
Allen Co.
Mossberg Pressed Steel Corp.
U S Bobbin & Shuttle Co.

BEAM HEADS.
Allen Co.
Jordan Mfg. Co.
Mossberg Pressed Steel Corp.
U S Bobbin & Shuttle Co.

BEAMS (STEEL).
Ryerson & Son, Inc., Jos. T.

BEAMING AND WARPING MACHINERY.
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BEARINGS.
Aldrich Machine Works.
Cresson-Morris Co.
Dodge Mfg. Co.
Fulton Supply Co.
Fafnir Bearing Co.
Hyatt Roller Bearing Co.
Moccasin Bushing Co.
Skayef Ball Bearing Co.
Strom Ball Bearing Mfg. Co.
Wicaco Screw & Mch. Works, Inc.

BELTING (LEATHER, CANVAS AND RUBBER).
American Supply Co.
Bond Co., Chas.
Fulton Supply Co.
Graton & Knight Mfg. Co.
Gastonia Belting Co.
Houghton & Co., E. F.
Leather Belting Exchange.
Rhoads & Sons, J. E.
Williams & Sons, I. B.

BELTING—CHAIN.
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Diamond Chain & Mfg. Co.
Dodge Mfg. Co.
Fulton Supply Co.
Link-Belt Company.
Morse Chain Co.

BELTING (ROUND—LEATHER).
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Gastonia Belting Co.
Houghton & Co., E. F.
Graton & Knight Mfg. Co.
Leather Belting Exchange.
Rhoads & Sons, J .E.

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BELT CONVEYORS.
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Dodge Mfg. Co.
Fulton Supply Co.
Link Belt Company.
Morse Chain Co.

BELT DRESSING.
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Gastonia Belting Co.
Graton & Knight Mfg. Co.
Rhoads & Sons, J. E.
Williams & Sons, I. B.

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Flexible Steel Lacing Co.
Fulton Supply Co.
Leather Belting Exchange.

BELT LACING (LEATHER).
Bond Co., Chas.
Dodge Mfg. Co.
Fulton Supply Co.
Gastonia Belting Co.
Graton & Knight Mfg. Co.
Leather Belting Exchange.
Rhoads & Sons, J. E.
Williams & Sons, I. B.

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Dodge Mfg. Co.
Fulton Supply Co.
Link-Belt Company.
Rhoads & Sons, J. E.

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Allen Co.

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BIRDS EYE VIEWS AND DRAWINGS.
Nous, Joseph.

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Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Textile Finishing Machry. Co.

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Carrier Eng. Corp.
General Electric Co.
Hardeman, Isaac.
Munro & Sons, Hugh F.
Sturtevant Co., B. F.
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Westinghouse Elec. & Mfg. Co.

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Oxweld Acetylene Co.

BOBBINS.
Brown Co., David.
Draper Corporation.
Fulton Supply Co.
Jordan Mfg. Co.
Lestershire Spool & Mfg. Co.
Parker Co., Walter L.
Shambow Shuttle Co.
Smith Bobbin Wks., L. C.
Textile Products Co.
U S Bobbin & Shuttle Co.
Whitin Machine Works.

BOBBIN HEADS.
Brown Co., David.
Jordan Mfg. Co.
Smith Bobbin Wks., L. C.
Textile Products Co.
U S Bobbin & Shuttle Co.

BOBBIN STRIPPERS.
Crompton & Knowles Loom Works.
Terrell Machine Co.

BOILERS.
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International Eng'g Wks.
Lombard Iron Works & Supply Co.
Nashville Industrial Corp.
Toomey, Frank.
Walsh & Weidner Boiler Co.

BOILER COMPOUNDS.
Dixon Crucible Co., Jos.

BOILER FEED WATER PURIFICATION.
Hungerford & Terry, Inc

BOILER FEED REGULATORS.
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Hardeman, Isaac.
Dixon Crucible Co., Jos.
Fulton Supply Co.
Jenkins Bros.
Sturtevant Co., B. F.

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BOILER TUBES AND FITTINGS.
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Ryerson & Son, Inc., Jos. T.

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Ryerson & Son, Inc., Jos. T.

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BOXES—MILL—FIBRE.
Rogers Fibre Co.

BOXES—MILL—METAL.
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Munro & Sons, Hugh F.

BOXES—MILL—WOODEN.
Allen Co.

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Atlanta Brush Co.
Hardy, Frank H.

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Dixon Crucible Co., Jos.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

BUCKETS AND PAILS—MILL.
Haskins Co., R. G.
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BUCKETS—ELEVATOR AND GRAB.
Link-Belt Company.

BUCKLES—COTTON TIE.
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Callahan Co., T. J.
Coolidge & Sons, F. J.
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Dufur & Co.
Kirkpatrick Lumber & Timber Co.
Montgomery Gravel Co.
National Paving Brick Mfg. Asso.
Richardson Co.
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BUSHINGS.
Moccasin Bushing Co.
Southern Spindle & Flyer Co.

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Butterworth & Sons Co., H. W.
Textile Finishing Mchry. Co.

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Carter Electric Co.

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Smith Mfg. Co.

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CANS—ROVING
Haskins Co., R. G.
Rogers Fibre Co.

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Oxweld Acetylene Co.

CARBON RODS AND PASTE (WELDING).
Oxweld Acetylene Co.

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Klauder-Weldon Dyeing Machine Co.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Sargent's Sons & Co., C. G.
Textile Finishing Mchry. Co.
Tolhurst Mch. Works.

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Davis & Furber Mch. Co.
Gessner, David
Howard & Bullough.
Proctor & Schwartz, Ins.
Roy & Son, B. S.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Whitin Machine Works.
Woonsocket Mch. & Press Co.

CARD & NAPPER CLOTHING.
Davis & Furber Mch. Co.
Howard Bros. Mfg. Co.

CARD FEEDS.
Davis & Furber Mch. Co.
Gessner, David
Easton & Burnham Mch. Co.
Proctor & Schwartz, Ins.
Schofield Co., Wm.
Whitin Machine Co.
Woonsocket Mch. & Press Co.

CARD GRINDING MACHINERY.
Davis & Furber Mch. Co.
Easton & Burnham Mch. Co.
Proctor & Schwartz, Inc.
Roy & Son, B. S.
Whitin Machine Works.

CARPET MACHINERY.
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Crompton & Knowles Loom Works.
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Proctor & Schwartz, Ins.
Schofield, Wm., Co.
Textile Finishing Mchry. Co.

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Curtis Pneumatic Machry. Co
Louden Machinery Co.
Mathews Conveyor Co.

CASES—WOODEN.
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CASTINGS—IRON
Briggs, Schaffner Co.
Cresson-Morris Co.
Lombard Fdry. & Mch. Co.
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(See Bleaching Materials.)

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Truscon Steel Co.

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Hockaday Co.
Sonneborn Sons, Inc., L.
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Wadsworth, Howland & Co., Inc.

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Tennessee Electric Power Co.

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Hardeman, Isaac.
Schaum & Uhlinger.
Tolhurst Mch. Wks.

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Mitchell & Co., W. K.

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Williams C L

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Bird-Potts Co., Inc.
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Draper Corp.
Mossberg Pressed Steel Corp.
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Buffalo Forge Co.
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Munro & Sons, Hugh F.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
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Gessner, David
Munro & Sons, Hugh F.
Philadelphia Drying Mchry. Co.
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Sargent's Sons Corp., C. G.
Textile Finishing Machinery Co., The.
Tolhurst Machine Works.

DUST COLLECTORS.
(See Blowers and Blowing Systems.)

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Proctor & Schwartz, Inc.
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American Yarn & Processing Co.
Bancroft & Sons, Jas.
Boger & Crawford.
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Franklin Process Co.
Sayles Finishing Plants.
United Piece Dye Works.
U S Finishing Co.

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Butterworth & Sons Co., H W.
Curtis & Marble Mch. Co.
Electro Bleaching Gas Co.
Emerson Apparatus Co.
Firsching, J. A.
Fletcher Works.
Franklin Process Co.
Fulton Co.
Gessner, David
Hungerford & Terry, Inc.
Hunt Machine Co., Rodney.
Klauder-Weldon Dyeing Mch. Co.
Leyland & Co., Thos.
Phila. Drying Machinery Co.
Proctor & Schwartz, Inc.
Reliance Machine Works.
Schaum & Uhlinger.
Smith, Drum & Co.
Textile Finishing Machinery Co., The.
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Franklin Process Co.

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Fleischmann Co., The.
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Newport Chemical Wks.
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Roessler & Hasslacher Chemical Co.
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Piedmont Iron Works.
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GEAR PULLERS.
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(See Motors and Generators.)

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(See Dishes.)

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Montgomery Gravel Co.

GREASE CUPS.
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(See Electric Lamp Guards.)

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Munro & Sons, Hugh F.

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Mitchell-Bissell Co.
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(See Finishing and Sizing Materials.)

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(See Shafting and Hangers.)

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Tayor Instrument Co.

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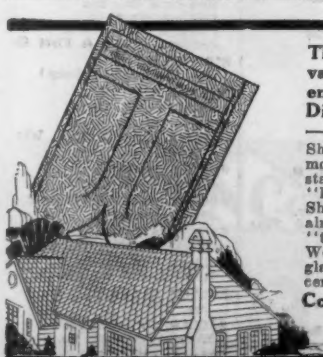

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Williams & Sons, I. B.

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Allen Company.

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Fletcher Works.
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LOOP PICKERS.
Jacobs Mfg. Co., E. H.

LUBRICANTS.
Dixon Crucible Co., Jos.
N. Y. & N. J. Lubricant Co.

LUBRICATORS.
Baldwin Picker Rod Lubricator Co., Inc.
Bowser & Co., S. F.
Carr Fastener Co.
Lunkenheimer Co.
N. Y. & N. J. Lubricant Co.
Walraven Co.

LUBRICATORS—PICKER ROD—AUTOMATIC.
Baldwin Picker Rod Lubricator Co., Inc.

LUBRICATING SYSTEMS.
Carr Fastener Co.,
Walraven Co.

LUG STRAPS.
(See Straps—Lug.)

LUG STICKS.
Allen Co.

LUMBER.
Southern Cypress Mfg. Asso.
Southern Wood Preserving Co.

LUNCH ROOM EQUIPMENT.
(See Restaurant.)

MACHINE GUARDS.
(See Guards—Machine.)

MACHINE TOOLS.
(See Tools.)

MACHINISTS
Bird-Potts Co., Inc.
Briggs-Schaffner Co.
Cresson-Morris Co.
Lombard Fdry. & Mch. Wks.
Piedmont Iron Works.
Wicaco Screw & Mch. Wks., Inc.

MANIFOLDS.
Orweld Acetylene Co.

MARKING POTS, STENCILS, INKS, ETC.
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.

MENDING EYES.
Harris Co., Geo. W.

MERCERIZED YARNS.
(See Yarn Manufacturers.)

MERCERIZERS.
Aberfoyle Mfg. Co.
Amer. Yarn & Processing Co.
Boger & Crawford.
Dixie Mercerizing Co.

MERCERIZED YARNS.
Aberfoyle Mfg. Co.
American Yarn & Pro. Co.
Boger & Crawford Co.
Dixie Mercerizing Co.
Hunter Mfg. & Comm. Co.

MERCERIZING MACHINERY.
Butterworth, H. W. & Sons Co.
Gessner, David
Smith, Drum & Co.
Textile Finishing Machinery Co.

METAL.
International Nickel Co.

METAL CEILINGS, ETC.
Truscon Steel Co.

METAL CUTTING MACHINES.
Atkins & Co., E. C.
Racine Tool & Mch. Co.

METALS—PERFORATED.
(See Screens and Sieves.)

METERS—FLOW, AIR, GAS, ELECTRIC, STEAM, ETC.
Allis-Chalmers Mfg. Co.
Carter Electric Co.
Foxboro Co., Inc.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

METERS—COUNTING.
(See Counters.)

MILL BASKETS AND BOXES.
(See Boxes—Mill.)

MILL ENGINEER.
(See Architects and Engineers.)

MILL VILLAGES.
(See Villages.)

MILL SUPPLIES—MISCELLANEOUS.
(See Supplies—Mill.)

MILL WHITE PAINT.
(See Paint.)

MOPS.
Atlanta Brush Co.

MOTION PICTURES.
(See Theatre Equipment.)

MOTORS AND GENERATORS—ELECTRIC.
Allis-Chalmers Mfg. Co.
Carter Electric Co.
Fulton Supply Co.
General Electric Co.
Hardeman, Isaac.
Perry-Mann Electric Co.
Southern Electric Supply Co.
Westinghouse Elec. & Mfg. Co.

MOVING PICTURE MCH. AND SUPPLIES.
(See Theatre Equipment.)

MULES.
Davis & Furber Mch. Co.

MUSICAL INSTRUMENTS.
Conn, Ltd., C. G.

NAPPER ROLL GRINDING MACHINES.
(See Card Grinders.)

NAPPING MACHINERY.
Davis & Furber Mch. Co.
Saco-Lowell Shops.

NAPPER CLOTHING.
Davis & Furber Mch. Co.
Howard Bros. Mfg. Co.

NAPPER SYSTEMS.
Hardeman, Isaac.

NEEDLES—KNITTING.
Franklin Needle Co.
Granite State Needle Co.
Torrington Co.

NETS—LAUNDRY.
Pendleton Mfg. Co.

NURSERIES.
Howard Hickory Co.
Van Lindley Nursery Co., J.

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Atlanta Stamp & Stencil Wks.
Jacobs & Co.

OFFICE PARTITIONS.
(See Partitions.)

OIL—LUBRICATING.
Johnson & Co., Inc., Oliver.
N. Y. & N. J. Lubricant Co.
Wadsworth, Howland & Co., Inc.

OIL ENGINES.
(See Engines—Oil.)

OILS—FINISHING.
(See Finishing and Sizing Materials.)

OIL CUPS.
(See Lubricants.)

OIL PAPER.
Bradley Mfg. Co., A. J.

OIL PUMPS.
(See Pumps—Oil.)

OIL SEPARATORS.
(See Separators.)

OIL TANKS.
Bowser & Co., Inc., S. F.

OILING DEVICES.
(See Lubricators.)

OPENING MACHINERY—COTTON, WOOL, WASTE, ETC.
Murray Company, The.
Proctor & Schwartz, Inc.
Saco-Lowell Shops.
Schofield Co., Wm.
Whitin Machine Works.
Woonsocket Mch. & Press Co.

OVENS — CONDITIONING (Electric).
Emerson Apparatus Co.

OVERHEAD CARRIERS.
Curtis Pneumatic Mchry. Co.
Louden Mchry. Co.

OXIDIZING MACHINERY.
Phila. Drying Machinery Co.

OXY-ACETYLENE APPARATUS AND SUPPLIES.
Bird-Potts Co., Inc.
Fulton Supply Co.
Orweld Acetylene Co.

OXYGEN.
Orweld Acetylene Co.

PACKINGS.
Jenkins Bros.

PAINT, ENAMELS, VARNISHES, ETC.
American Cement Paint Co.
Cooledge & Sons, F. J.
Dixon Crucible Co., Jos.
Hockaday Co.
Johnson & Co., Oliver.
Sonneborn Sons, Inc., L.
Toch Brothers.
Truscon Laboratories.
Wadsworth, Howland & Co., Inc.
Warren Co.
Williams, C. L.

PAINT SPRAYING EQUIPMENT.
Wadsworth, Howland & Co., Inc.

PAINTING CONTRACTORS.
(See Contractors.)

PANEL BOARD.
(See Switchboards.)

PAPER.
Bradley Mfg. Co., A. J.

PARTITIONS—STEEL AND WIRE.
Cyclone Fence Co.

PAVING BRICKS.
National Paving Brick Mfg. Asso.

PERBORATE OF SODA.
Roessler & Haslacher Chemical Co.

PERFORATED METAL.
(See Screens and Sieves.)

PEROXIDES.
Roessler & Haslacher Chemical Co.

PICK COUNTERS.
(See Counters.)

PICKERS—CURLED HAIR.
Proctor & Schwartz, Inc.
Schofield Co., Wm.

PICKERS—LEATHER.
Bond Co., Chas.
Garland Mfg. Co.
Gastonia Belting Co.
Graton & Knight Mfg. Co.
Jacobs Mfg. Co., E. H.

PICKER LOOPS.
Jacobs Mfg. Co., E. H.

PICKER BAGS.
Smith Mfg. Co.

PICKER GEARS.
(See Gears.)

PICKER STICKS.
Garland Mfg. Co.

PICKING MACHINERY AND EQUIPMENT.
Davis & Furber Mch. Co.
Gessner, David
Howard & Bullough Am. Machine Co.
Proctor & Schwartz, Inc.
Piedmont Iron Works.
Saco-Lowell Shops.
Schofield Co., Wm.
Whitin Machine Works.
Woonsocket Mch. & Press Co.

PIN BOARDS.
Washburn, Inc.

PINIONS.
General Electric Co.
Piedmont Iron Works.

PIPE—STEEL RIVETED.
Fulton Supply Co.
Hardeman, Isaac.
Youngstown Sheet & Tube Co.

PIPE AND PIPE FITTINGS.
Fulton Supply Co.
Hardeman, Isaac.
Lunkenheimer Co.
Parks-Cramer Co.

PIPING CONTRACTORS.
Hardeman, Isaac.

PIPE JOINT COMPOUND.
Dixon Crucible Co., Jos.
Fulton Supply Co.

PIPING—COTTON.
Youngstown Sheet & Tube Co.

PIPE BENDING.
Youngstown Sheet & Tube Co.

PLAYGROUND APPARATUS & EQUIPMENT.
Bandle-Spence Mfg. Co.

PNEUMATIC MACHINERY & TOOLS.
Curtis Pneumatic Mchry. Co.
Independent Pneumatic Tool Co.

PORCELAIN GUIDES.
Mitchell-Bissell Co.

POSTS—FENCE (WOOD).
Southern Wood Preserving Co.

POWER—ELECTRIC.
Tennessee Electric Power Co.

POWER TRANSMISSION EQUIPMENT.
Aldrich Machine Works.
Allis-Chalmers Mfg. Co.
Baldwin Chain & Mfg. Co.
Bond Co., Chas.
Carlyle-Johnson Mch. Co.
Cresson-Morris Co.
Diamond Chain & Mfg. Co.
Dixon Crucible Co., Jos.
Dodge Mfg. Co.
Fafnir Bearing Co.
Flexible Steel Lacing Co.
Fulton Supply Co.
Gastonia Belting Co.
General Electric Co.
Graton & Knight Mfg. Co.
Hyatt Roller Bearing Co.
Leather Belting Exchange.
Link-Belt Company.
Mills & Lupton Supply Co.
Mocassin Bushing Co.
Morse Chain Co.
Piedmont Iron Works.
Reeves Pulley Co.
Rhoads & Sons, J. B.
Skayef Ball Bearing Co.
Strom Ball Bearing Mfg. Co.
Westinghouse Elec. & Mfg. Co.
Wicaco Screw & Mch. Wks., Inc.
Williams & Sons, I. B.

PREHEATING APPARATUS.
Orweld Acetylene Co.

PRESERVATIVE PAINT FOR METAL WORK.
(See Paints.)

PRESSES.
American Laundry Mchry. Co.
Butterworth & Sons Co., H. W.
Economy Baler Co.
Lagomarsino Bros. Co.
Phila. Drying Mch. Co.
Proctor & Schwartz, Inc.
Reliance Machine Works.
Smith, Drum & Co.
Textile Finishing Machinery Co., The.

PRESSURE GAUGES.
(See Gauges.)

PRESSURE REGULATORS.
(See Regulators—Pressure.)

PRINTERS (CLOTH).
(See Dyers.)

PRINTING MACHINERY (CLOTH).
Gessner, David

PRINTING.
Jacobs & Co.
Showalter Printing Co., A. J.

PRINTING EXTRACTORS—HYDRO.
Tolhurst Machine Works.

PROPELLER FANS.
(See Blowers.)

PROPERTY BUYING AND SELLING (TEXTILE).
Battle-Ward Sales Co.

PSYCHROMETERS.
Foxboro Co., Inc., The.

PULLEYS.
Cresson-Morris Co.
Dodge Mfg. Co.
Fulton Supply Co.
Link-Belt Company.
Reeves Pulley Co.

PULLEY COVERING.
Reeves Pulley Co.
Williams & Sons, I. B.

PUMPS.
Allis-Chalmers Mfg. Co.
American Oil Pump & Tank Co.
Fulton Supply Co.
Goulds Mfg. Co.
Hardeman, Isaac.
Ingersoll-Rand Co.
Sydner Pump & Well Co., Inc.
Toomey, Frank.
Walsh & Weidner Boiler Co., The.
Westinghouse Elec. & Mfg. Co.

PUMPS—OIL.
American Oil Pump & Tank Co.
Bowser & Co., S. F.
Lunkenheimer Co.

PUMP GOVERNORS.
Cash Co., A. W.
Hardeman, Isaac.

PUMP VALVES.
(See Valve Discs.)

PYROMETERS.
Foxboro Co.
Taylor Instrument Co.

QUILLS.
Jordan Mfg. Co.
U S Bobbin & Shuttle Co.

QUILL CLEANING MACHINES.
Terrell Machine Co.

RAILS (STEEL).
Ryerson & Son, Inc., Jos. T.

RAILROADS.
Southern Ry.

RECEIVERS (AIR).
Hardeman, Isaac.

RECEPTACLES—FIBRE.
(See Fibre Products.)

RECOVERING TOP FLATS.
Howard Bros. Mfg. Co.

RECORDING INSTRUMENTS.
Bristol Co.
Foxboro Co., Inc.
General Electric Co.
Taylor Instrument Co.

REEDS AND REED WIRE.
American Supply Co.
Atlanta Harness & Reed Mfg. Co.
Emmons Loom Harness Co.
Steel Heddle Mfg. Co.
Walker Mfg. Co.

REELS.
Allen Company.
Crompton & Knowles Loom Works.
Draper Corporation.
Easton & Burnham Mch. Co.
Hunt Machine Co., Rodney.
Mossberg Pressed Steel Co.
Saco-Lowell Shops.
Schofield Co., Wm.
Whitin Machine Works.

REFLECTORS—LAMPS.
(See Lamp Reflectors.)

REGULATORS—LIQUID LEVEL.
Foxboro Co., Inc.
Fulton Co.
General Electric Co.

REGULATORS (COMPRESSED GAS).
Orweld Acetylene Co.

REGULATORS (BOILER FEED)
(See Boiler Feed Regulators.)

REGULATORS (DRAFT).
(See Draft Regulators.)

REGULATORS—PRESSURE.
Cash Co., A. W.
Foxboro Co., Inc., The.
Fulton Co.
General Electric Co.
Hardeman, Isaac.
Taylor Instrument Co.

REGULATORS—TEMPERATURE.
(See Temperature Controllers.)

REINFORCING SLAG.
Birmingham Slag Co.

REPAIRING—ELECTRICAL.
Bouligny, Inc., R. H.
Briggs Shaffner Co.
Huntington & Guerry, Inc.
Michael & Bevins, Inc.
Southern Electrical Supply Co.
Westinghouse Elec. & Mfg. Co.

REPAIRING—TEXTILE MACHINERY, ETC.
Bird-Potts Co., Inc.
Briggs-Shaffner Co.
Piedmont Iron Works.
Southern Spindle & Flyer Co.

RIBBERS.
(See Knitting Machinery.)

RIB TOP CUTTERS.
Wildman Mfg. Co.

RINGS—PISTON
Wicaco Screw & Mch. Wks., Inc.

RINGS—SPINNING.
(See Spinning Rings.)

ROCKER SHAFT BEARINGS.
(See Bearings.)

RODS (WELDING).
Orweld Acetylene Co.

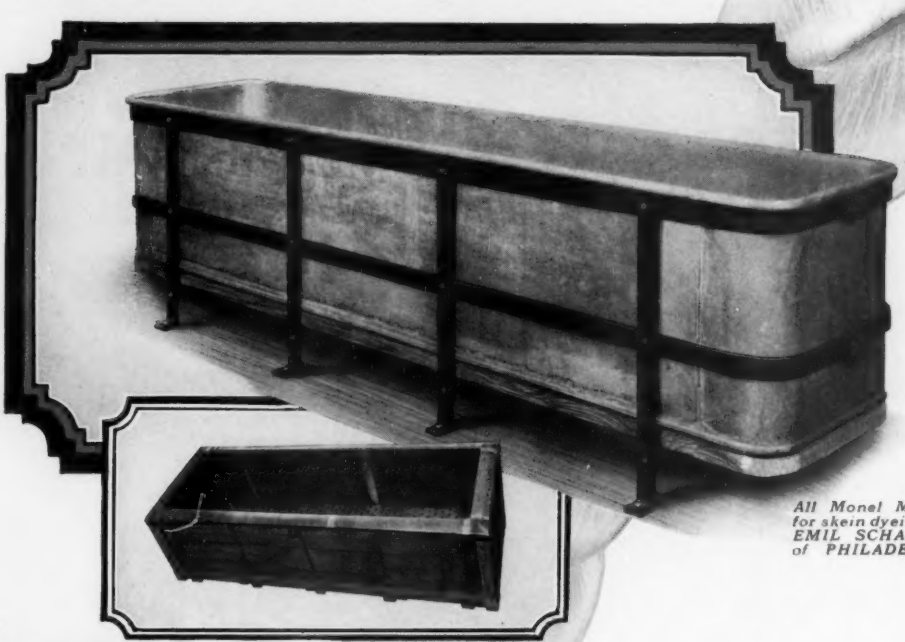
ROLLER BEARINGS.
Hyatt Roller Bearing Co.

ROLLER CLOTH.
(See Cloth.)

ROLLER CONVEYORS.
Mathews Conveyer Co.

ROLLER LEATHER.
Bond & Co., Chas.

Economy Budgets
call for the use of Monel Metal Dye Kettles



All Monel Metal kettles for skein dyeing. Made by EMIL SCHAEFFER CO., of PHILADELPHIA, PA.

Monel Metal lined wood tank made by EMIL SCHAEFFER CO., of PHILADELPHIA. Almost any ordinary wood tank may be lined with Monel Metal

THERE is never greater need for Monel Metal equipment than when conditions demand reduced costs.

Monel Metal certainly does help to reduce operating expenses. It decreases spoilage by insuring clean, pure color and undamaged fibres. It cuts labor costs by cutting down time for color changes. It saves floor space too, for the capacity of all Monel Metal tanks is greater, per square foot of space occupied.

Monel Metal will not weaken before the attacks of dye house chemicals. It resists corrosion and is immune to rust. It is easily cleaned—even when the change of color is extreme.

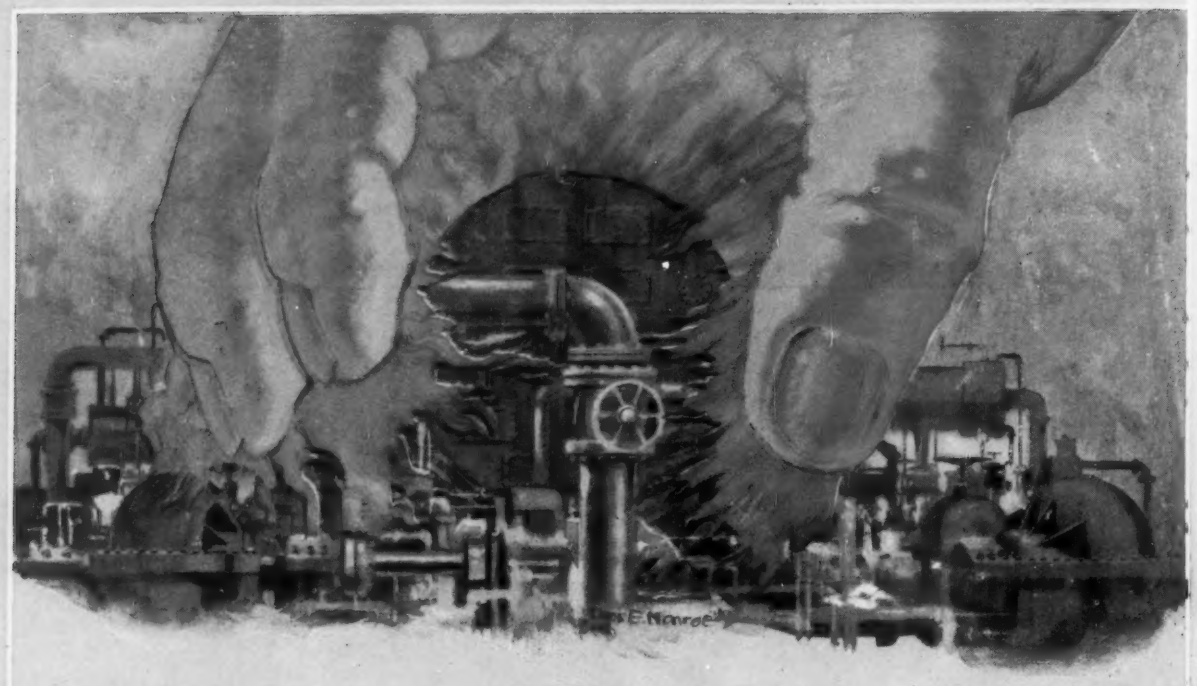
It is strong and tough—years of service fail to mar the smooth hard surface that saves delicate fibres from injury. As a matter of fact, the longer it is used, the smoother the surface becomes.

Monel Metal tanks are a big step toward more economical operation. You should have full information. Write for it today.

Send for List B of available literature.

THE INTERNATIONAL NICKEL COMPANY
67 WALL STREET NEW YORK CITY

INCo Monel metal



In the Grip of Withering Heat

Hot gases and superheated steam go hand in hand. These foes of metal work havoc as they go, leaving behind them a trail of scarred and pitted surfaces. They shorten the life of boilers, valves and fittings. But Monel Metal and Nickel resist their destructive attack.

Monel Metal has been used for many varied types of equipment and construction because

—its strength is not materially lessened by high temperature.

—hot gases do not destructively oxidize its surface.

—it is more generally resistant to corrosion than any other commercial metal.

—its great strength enables it to withstand the wear of constant use.

Monel Metal valves seat straight and true after years of service. Pump rods retain their smooth, frictionless surface indefinitely. Turbine blades of Monel Metal seldom require replacement. Equipment fabricated of this silvery metal is easily kept clean and polished.

New uses are discovered as information spreads. Wherever its application, whatever its use, there is one dominant fact: Equipment or construction of Monel Metal is built to last—it *will* endure.

Monel Metal can be machined, cast, forged, spun, punched, drawn, brazed, soldered and welded. Wherever it is used, wear and corrosion are largely prevented. To help solve your metal problems you may have the benefit of our experience. Write for List B of available literature.

INCo MONEL METAL TRADE MARK

Monel Metal is a technically controlled Nickel-Copper alloy of high nickel content. It is mined, smelted, refined, rolled and marketed solely by The International Nickel Company. The name "Monel Metal" is a registered trade-mark.

INCo NICKEL TRADE MARK

THE INTERNATIONAL NICKEL COMPANY, 67 WALL STREET, NEW YORK CITY.

If It's A Broadside—

If it is an especially large illustration for an especially large piece of literature, chart, birds eye view, map, etc. Whether it be in one or more colors, our plant is equipped to supply your needs. No halftone or line plate too large or too small for our equipment.

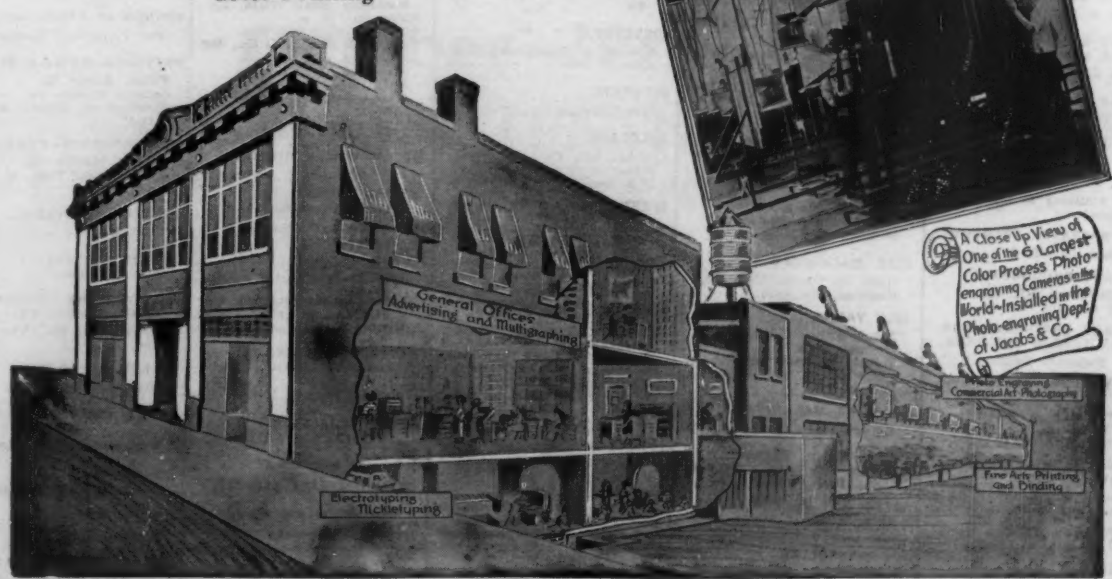
Illustrating Your Literature

Sometimes in the preparation of your sales and advertising plans you find the need of some especially prepared piece of literature, the execution of which will baffle your photographer, electrotyper and printer. Frequently you may seek a service that the ordinary plant cannot give.

Our plant is designed and equipped for the accomplishment of many difficult products that cannot be secured from most photo-engraving establishments; is equipped to furnish the best of photo-engraving, electrotyping, printing, nickeltyping, commercial art and allied service, whether large or small, whether one or more colors. The extent of our equipment is reflected in the large process camera, which can furnish you with process color plates as large as a yard square. One of the 6 largest in the world. If you have an idea you wish carried into execution, we are at your service. We will gladly perfect it and illustrate it.

Battery of Cameras in the Photo-Engraving Department

A Close Up View of One of the 6 Largest Color Process Photo-engraving Cameras in the World—Installed in the Photo-engraving Dept. of Jacobs & Co.



Jacobs & Company
Clinton, S. C.

Advertising, Commercial Art
Photo-Engraving—Electrotyping
Nickeltyping
Color Printing

BUYERS' INDEX—Continued.

ROLLS—CALENDER.
Butterworth & Sons Co., H. W.
Textile Finishing Mchy. Co.
U S Bobbin & Shuttle Co.
Washburn, Ina.

ROLLS—RUBBER COVERED.
Butterworth & Sons Co., H. W.
Textile Finishing Mchy. Co.
Stowe & Woodward Co.

ROLLS—STEEL.
Butterworth & Sons Co., H. W.
Southern Spindle & Flyer Co.
Textile Finishing Mchy. Co.
U S Bobbin & Shuttle Co.
Washburn, Inc.

ROLLS (WOODEN).
U S Bobbin & Shuttle Co.
Washburn, Ina.

ROOFING.
Cortright Metal Roofing Co.
Kirkpatrick Lumber & Timber Co.
Richardson Co.
Southern Wood Preserving Co.
Wadsworth, Howland & Co.

ROOFERS.
Kirkpatrick Lumber & Timber Co.

ROOFING AUXILIARIES (PIPE GUTTERS—EAVE TROUGH ETC.)
Kirkpatrick Lumber & Timber Co.

ROOF AND CEMENT COATING.
American Cement Paint Co.
Hockaday Co.
Johnson & Co., Inc., Oliver.
Sonneborn Sons, Inc., L.
Toch Brothers.
Truscon Laboratories.
Wadsworth, Howland & Co.

ROPE—TRANSMISSION.
Allis-Chalmers Mfg. Co.
Cresson-Morris Co.
Link-Belt Company.

ROVING CANS.
(See Cans—Roving.)

ROVING FRAMES AND MACHINERY.
Gessner, David
Howard & Bullough.
Saco-Lowell Shops.
Whitin Machine Works.
Woonsocket Mch. & Press Co.

RUBBER COVERED ROLLS.
Stowe & Woodward Co.

RUBBER SPECIALTIES (TEXTILE MILLS).
Stowe & Woodward Co.

RUBBER STAMPS.
(See Stamps, Stencils, Etc.)

RUST PROOFING COMPOUND.
Toch Brothers.

SALTS.
(See Finishing & Sizing Materials.)

SASH OPERATOR (WINDOW).
Callahan Co., T. J.

SANITARY PRODUCTS.
Rundle-Spence Mfg. Co.
Vogel Co., Jos. A.

SANITARY ENGINEERS, CONTRACTORS & BUILDERS.
(See Engineers—Sanitary.)

SASH-WINDOW—STEEL.
(See Window Sash.)

SAW FRAMES & BLADE (HACK).
Atkins & Co., E. C.

SAWING MACHINES AND SAW BLADES.
Atkins & Co., E. C.
Racine Tool & Mch. Co.

SAXOPHONES, ETC.
(See Musical Instruments.)

SCALES.
Toledo Scale Co.

SCALE PREVENTER—BOILER.
(See Boiler Feed Water Purification.)

SCREENS AND SIEVES—PERFORATED.
Allis-Chalmers Mfg. Co.
Erdle Perforating Co.
Link Belt Company.

SCREWS.
Wicaco Screw & Mch. Wks., Inc.

SCOURING MACHINERY.
(See Washers—Cloth.)

SCRUBBING MACHINE—FLOOR.
American Scrubbing Equip. Co.
Vail & Co., D. R.

SCRUBBING AND WASHING POWDERS.
Mathieson Alkali Works.
Warren Soap Mfg. Co.

SCUTCHERS.
Leyland & Co., Thos.
Whitin Mch. Wks.

SECOND HAND MACHINERY AND SUPPLIES.
Battle-Ward Sales Co.
Nashville Industrial Corp.
Toomey, Frank, Inc.

SECTION BEAMS.
(See Beams.)

SELVAGE HARNESS.
(See Harness.)

SEWING MACHINES.
Morrow Machine Co., The.
Textile Finishing Mchy. Co.

SHADES—ELECTRIC LAMP.
(See Reflectors.)

SHAFTING AND HANGERS.
Allis-Chalmers Mfg. Co.
Cresson-Morris Co.
Dodge Mfg. Co.
Fafnir Bearing Co.
Fulton Supply Co.
Hyatt Roller Bearing Co.
Link-Belt Company.
Skayef Ball Bearing Co.

SHEET STEEL (PLAIN AND GALVANIZED).
Hardeman, Isaac.
Ryerson & Son, Inc., Jos. T.

SHELVING—SECTIONAL STEEL.
Hyatt Roller Bearing Co.

SHINGLES (METAL).
Cortright Metal Roofing Co.

SHINGLES—WOOD.
Southern Cypress Mfg. Asso.
Southern Wood Preserving Co.

SHIPPING ROOM MACHINERY AND SUPPLIES.
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.
Smith Mfg. Co.
Toledo Scale Co.

SHUTTLES.
Brown Co., David.
Crompton & Knowles Loom Works.
Draper Corporation.
Jordan Mfg. Co.
Shambow Shuttle Co.
U S Bobbin & Shuttle Co.
Williams Co., J. H.

SILK MACHINERY
Davis & Furber Mch. Co.
Eastwood, Benjamin.

SILK YARNS.
Judson Mills.
Meritzer, H. S.
Tubize Artificial Silk Co. of America.
Visocse Co.

SINGEING MACHINERY.
Butterworth & Sons Co., H. W.
Phila. Drying Machine Co.
Textile Finishing Machinery Co., The.

SITES FOR FACTORIES.
(See Industrial Sites.)

SIZE BOX TEMPERATURE CONTROLLER.
Foxboro Co., Inc., The.
Fulton Co.

SIZE KETTLES AND TANKS.
(See Bleaching Kiers or Tanks.)

SIZING AND FINISHING COMPOUNDS.
(See Finishing and Sizing Materials.)

SKEWERS.
Jordan Mfg. Co.

SLAG FOR CONCRETE.
Birmingham Slag Co.

SLASHERS AND SLASHER ROOM SUPPLIES.
Butterworth & Sons Co., H. W.
Easton & Burnham Mch. Co.
Gessner, David
Howard & Bullough.
Mossberg Pressed Steel Corp.
Saco-Lowell Shops.
Textile Finishing Machinery Co., The.

SLASHER CLOTH.
(See Cloth.)

SLASHER FANS.
Hardeman, Isaac.

SLASHER TAPE.
(See Tape—Slasher.)

SLATE ASPHALT ROOFING.
Barrett Co.

SLUBBERS.
Howard & Bullough.
Saco-Lowell Shops.
Whitin Machine Works.
Woonsocket Mch. & Press Co.

SMOKE STACKS.
Hardeman, Isaac.
Walsh & Weidner Boiler Co.

SOAPS—TEXTILE.
American Diamalt Co.
Arabol Mfg. Co.
Arnold, Hoffman & Co.
Borne, Scrymser Co.
Ciba Co., Inc.
Fleischmann Co., The.
Kali Mfg. Co.
Klipstein & Co., A.
Lennig & Co., Chas.
Mathieson Alkali Works, Inc.
Newport Chemical Wks.
Rohm & Haas Co.
Sonneborn Sons, Inc., L.
Stein, Hall & Co.
United Chemical Products Corp.
Warren Soap Mfg. Co.
Wolf & Co., Jacques.

SOFTENERS—COTTON.
(See Finishing & Sizing Materials.)

SOFTENERS—WATER.
(See Water Softeners.)

SOLDERLESS CONNECTORS—FRANKEL.
Westinghouse Elec. & Mfg. Co.

SOLOZONE.
Roessler & Hasslacher Chem. Co.

SOLVENTS.
(See Finishing.)

SPEEDERS.
Jordan Mfg. Co.
Parker & Co., Walter L.
U S Bobbin & Shuttle Co.

SPEED VARYING TRANSMISSION.
Reeves Pulley Co.

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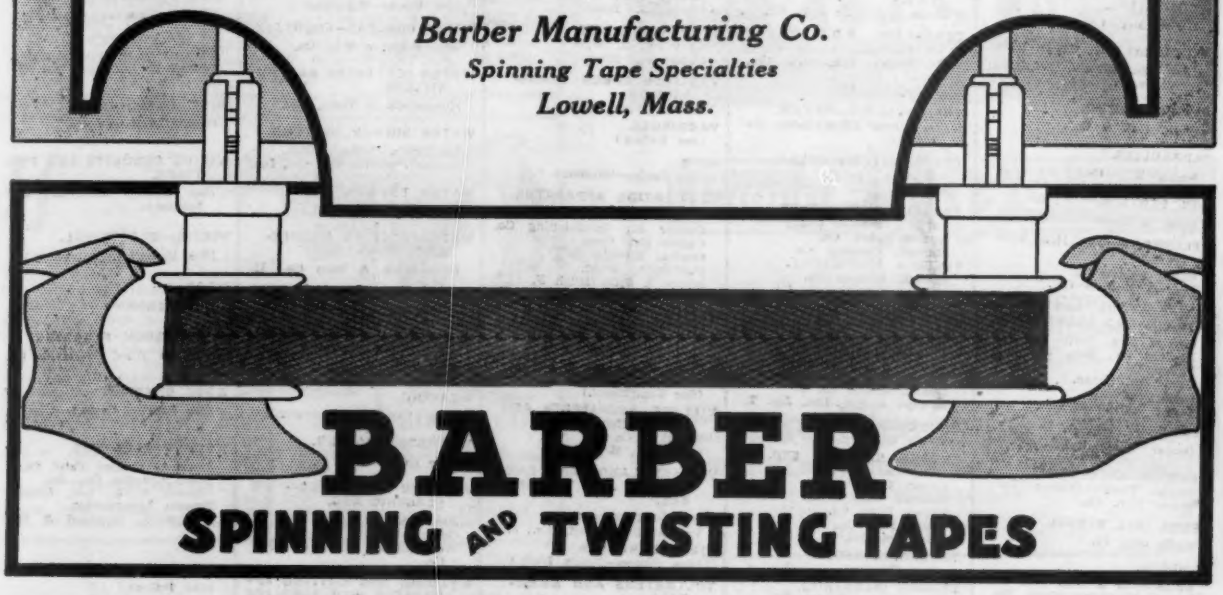

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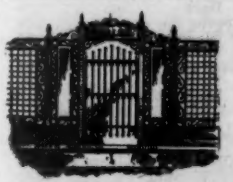

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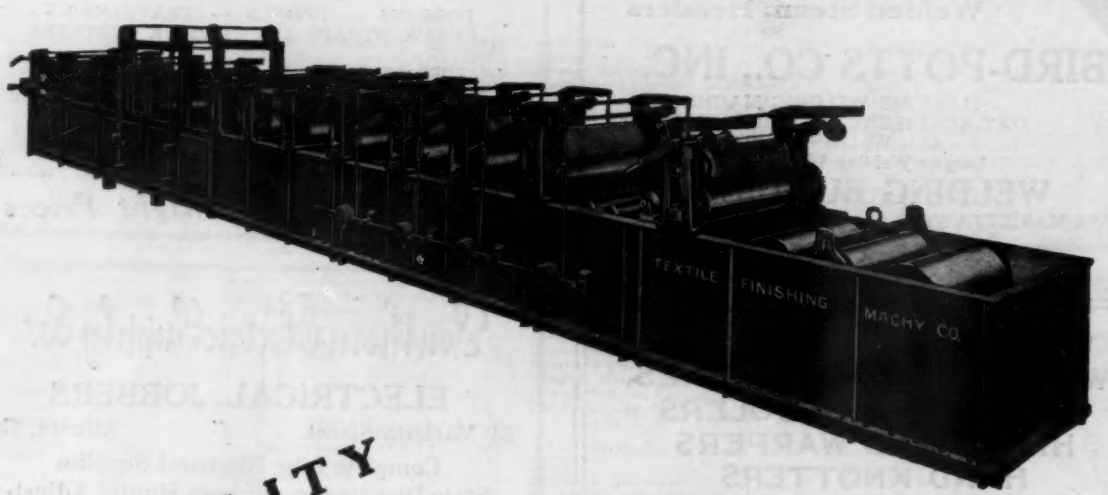

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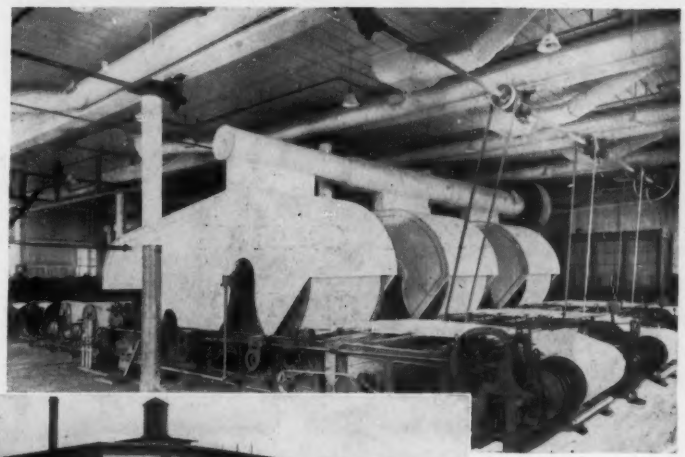

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